42279 69914

SEARCH REQUEST FORM Scientific and Technical Information Center - EIC2800

Rev. 8/27/01 This is an experimental format -- Please give suggestions or comments to Jeff Harrison, CP4-9C18, 306-5429.

Date 6/28/02 Serial # 09/485,227 Priority Application Date 12/7/98

Your Name M. Lewis Examiner # ____

AU 2822 Phone 305-3943 Room ____

In what format would you like your results? Paper is the default. PAPER DISK EMAIL

If submitting more than one search, please prioritize in order of need.

The EIC searcher normally will contact you before beginning a prior art search. If you would like to sit with a searcher for an interactive search, please notify one of the searchers.

Where have you searched so far on this case?

Circle: USPT DWPI EPO Abs JPO Abs IBM TDB

Other: ____

What relevant art have you found so far? Please attach pertinent citations or Information Disclosure Statements. ____

What types of references would you like? Please checkmark:

Primary Refs ✓ Nonpatent Literature ___ Other ____

Secondary Refs ✓ Foreign Patents ___

Teaching Refs ___

What is the topic, such as the **novelty**, motivation, utility, or other specific facets defining the desired **focus** of this search? Please include the concepts, synonyms, keywords, acronyms, registry numbers, definitions, structures, strategies, and anything else that helps to describe the topic. Please attach a copy of the abstract and pertinent claims.

Claims 1-18 (Independent Claims 1,2,3,4,5,6 + 9)

Prob (See Page 2 [illegible] 1st paragraph

" " 3

" " 4 (last paragraph)

" " 5 " "

" " 6 (line 1-2)

Solution: " Abstract + structure illustrated in claims

Staff Use Only

Searcher: Derrick Blalock

Searcher Phone: ____

Searcher Location: STIC-EIC2800, CP4-9C18

Date Searcher Picked Up: 7/1/02

Date Completed: 7/1/02

Searcher Prep/Rev Time: 60

Online Time: 124

Type of Search

Structure (#) ____

Bibliographic ✓

Litigation ____

Fulltext ____

Patent Family ____

Other ____

Vendors

STN ✓

Dialog 2

Questel/Orbit ____

Lexis-Nexis ____

WWW/Internet ____

Other ____

EIC2800

Search Results

Feedback Form (Optional)

Scientific & Technical Information Center

The search results generated for your recent request are attached. If you have any questions or comments (compliments or complaints) about the scope or the results of the search, please contact *the EIC searcher* who conducted the search ***or contact***:

Jeff Harrison, Team Leader, 306-5429

Voluntary Results Feedback Form

- *I am an examiner in Workgroup:* __________ *(Example: 2830)*

- *Relevant prior art **found**, search results used as follows:*

  - ☐ 102 rejection
  - ☐ 103 rejection
  - ☐ Cited as being of interest.
  - ☐ Helped examiner better understand the invention.
  - ☐ Helped examiner better understand the state of the art in their technology.

  Types of relevant prior art found:

  - ☐ Foreign Patent(s)
  - ☐ Non-Patent Literature
    (journal articles, conference proceedings, new product announcements etc.)

- *Relevant prior art **not found**:*

  - ☐ Results verified the lack of relevant prior art (helped determine patentability).
  - ☐ Search results were not useful in determining patentability or understanding the invention

Other Comments:

Drop off completed forms in **CP4-9C18**, or send to **Jeff Harrison, CP4-9C18.**

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     FILE 'REGISTRY' ENTERED AT 10:33:26 ON 01 JUL 2002
L1            3 S COPPER OXIDE/CN
L2          273 S (CU AND O)/ELS AND 2/ELC.SUB
L3            1 S NICKEL/CN
L4            1 S COPPER/CN

     FILE 'HCAPLUS' ENTERED AT 10:35:36 ON 01 JUL 2002
L5        23273 S COMPOSITE()MATERIAL
L6        51197 S (THERMAL OR HEAT###)(2N)(EXPANSION OR DILATION)
L7        12354 S VICKER##()HARD####
L8          136 S AGGREGATE?(2N)ELONGAT?
L9           56 S RADIATOR()PLATE
L10       33311 S (CONDUCTIVE)(2N)(FILM OR LAYER OR COAT####)
L11      984040 S COPPER OR CU
L12       84681 S (COPPER OR CU)()(OXIDE OR O OR MONOOXIDE OR (MONO()OXIDE)) OR
L13       11559 S (NICKEL OR NI)()PLAT###
L14           0 S L5 AND L9
L15           1 S L5 AND L8
L16         649 S L5 AND L6
L17           6 S L16 AND AGGREGATE
L18           6 S L17 NOT L15
L19          13 S L16 AND (METAL AND INORGANIC)
L20          12 S L19 NOT (L15 OR L17)
L21           5 S L16 AND L7
L22           5 S L21 NOT (L15 OR L17 OR L19)
L23          92 S L5 AND L7
L24           2 S L23 AND ((L4 OR L11) AND (L1 OR L2 OR L12))
L25           2 S L24 NOT (L15 OR L17 OR L19 OR L21)
L26           1 S L23 AND L10
L27          22 S L23 AND (L11 OR L4)
L28          21 S L27 NOT (L15 OR L17 OR L19 OR L21 OR L26)
L29           2 S L23 AND (L2 OR L12)
L30           0 S L29 NOT (L15 OR L17 OR L19 OR L21 OR L26 OR L28)
L31           2 S L16 AND L13
L32           2 S L31 NOT (L15 OR L17 OR L19 OR L21 OR L26 OR L28)

     FILE 'WPIX, JAPIO' ENTERED AT 10:59:44 ON 01 JUL 2002
L33        1117 S L5 AND L6
L34           3 S L33 AND L7
L35           6 S L33 AND (L11 AND L12)
L36           5 S L33 AND L13
L37           5 S L36 NOT (L34 OR L35)
L38           1 S L33 AND L9
L39           0 S L38 NOT (L34 OR L35 OR L36)
L40         208 S L33 AND L11
L41           7 S L40 AND L10
L42           7 S L41 NOT (L34 OR L35 OR L36)
L43          64 S L33 AND (METAL AND INORGANIC)
L44          59 S L43 NOT (L34 OR L35 OR L36 OR L41)
L45         133 S L6 AND L7
L46           0 S L45 AND L12
L47           1 S L45 AND L13
L48           1 S L47 NOT (L34 OR L35 OR L36 OR L41 OR L43)
L49           1 S L45 AND (METAL AND INORGANIC)
L50           1 S L49 NOT (L34 OR L35 OR L36 OR L41 OR L43 OR L47)
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L15 ANSWER 1 OF 1 HCAPLUS COPYRIGHT 2002 ACS
AN 2002:96638 HCAPLUS
DN 136:326257
TI Morphology selection of nanoparticle dispersions by polymer media
IN Kim, Jaeup U.; O'Shaughnessy, Ben
SO Los Alamos National Laboratory, Preprint Archive, Condensed Matter, 1-8, arXiv:cond-mat/0202026
CODEN: LNCMFR
URL: http://xxx.lanl.gov/pdf/cond-mat/0202026
DT Preprint
LA English
AB Design-able media can control properties of nano-**composite materials** by spatially organizing nanoparticles. Here we theor. study particle organization by ultrathin polymer films of grafted chains ("brushes"). Polymer-sol. nanoparticles smaller than a brush-detd. threshold disperse in the film to a depth scaling inversely with particle vol. In the polymer-insol. case, aggregation is directed: provided particles are non-wetting at the film surface, the brush stabilizes the dispersion and selects its final morphol. of giant **elongated aggregates** with a brush-selected width.
RE.CNT 21 THERE ARE 21 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L18 ANSWER 1 OF 6 HCAPLUS COPYRIGHT 2002 ACS
AN 2001:803593 HCAPLUS
DN 136:41567
TI Thermal conductivity and mechanical properties related to microstructure of a high alumina refractory castable
AU Simonin, F.; Elaqra, H.; Olagnon, C.; Fantozzi, G.
CS INSA, GEMPPM, UMR 5510, Villeurbanne, F69621, Fr.
SO Silicates Industriels (2001), 66(3-4), 33-39
CODEN: SIINAT; ISSN: 0037-5225
PB Silicates Industriels
DT Journal
LA English
AB Thermo-mech. properties and thermal cond. of a high alumina refractory contg. 10 wt.% of synthetic spinel have been studied, from room temp. to 1600.degree.. Results have been correlated with the microstructural and mineralogical evolutions by means of X-ray diffraction and SEM as a function of the firing temp. The refractory is considered as a **composite material**, formed by coarse **aggregates** embedded in a fine matrix. For this purpose, dry castable raw materials mixts. were sieved under 125 .mu. in order to sep. the fraction considered as the matrix of this castable. Matrix samples were obtained for thermomech. characterization and the results were compared to those corresponding to the whole refractory. The different properties are strongly dependent on the temp. since many transformations occur in the binder from the hydration at room temp. to the sintering process up to 1600.degree.. The dehydration process at 200-900.degree. is responsible for the great variation of the thermal and thermomech. properties. At higher temps., crystn. of calcium aluminates plays a role of major importance on these properties.
RE.CNT 17 THERE ARE 17 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L18 ANSWER 2 OF 6 HCAPLUS COPYRIGHT 2002 ACS
AN 1998:741041 HCAPLUS
DN 130:70018
TI Micromechanical modeling of functionally graded materials
AU Reiter, Thomas; Dvorak, George J.
CS Center for Composite Materials and Structures, Rensselaer Polytechnic Institute, Troy, NY, 12180-3590, USA
SO Solid Mechanics and Its Applications (1998), 60(Transformation Problems in Composite and Active Materials), 173-184
CODEN: SMAPFS; ISSN: 0925-0042
PB Kluwer Academic Publishers
DT Journal
LA English
AB Thermoelastic response of graded **composite material** is examd. for both uniform changes in temp. and steady-state heat conduction in the gradient direction. Detailed finite element studies of the overall response and local fields in the discrete models were conducted, using large plane-array domains with simulated skeletal and particulate microstructures. Homogenized layered models with the same compn. gradient and effective properties, derived from the Mori-Tanaka and/or self-consistent methods, were analyzed under identical boundary conditions. Comparisons of temp. distributions and the overall and local fields predicted by the discrete and homogenized models were made using a C/SiC composite system with very different Young's moduli of the phases, and relatively steep compn. gradients. Close agreement with the discrete model predictions is obsd. for homogenized models which derive effective

properties ests. from several averaging methods: In those parts of the graded microstructure which have a well-defined continuous matrix and discontinuous reinforcement, the effective moduli, **expansion** coeffs. and **heat** conductivities are approximated by the Mori-Tanaka ests. In skeletal microstructures that often from transition zones between clearly defined matrix and reinforcement phases, the effective properties are approximated by the self-consistent ests. Subject to these selection rules, the averaging methods originally developed for statistically homogeneous **aggregates** under uniform overall fields may be applied to graded material subjected to nonuniform overall loads. A complete description of this investigation was presented by T. Reiter, G. J. Dvorak and V. Tvergaard, J. Mech. Phys. Solids, 45, 1281-1302, and in a forthcoming paper in the same vol. The results do not suggest that nonlocal or new micromech. theories are needed for modeling functionally graded materials. Such theories appear appropriate only in those limited vols. of the material where the field avs. are very small and their gradients very large.

RE.CNT 13 THERE ARE 13 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L18 ANSWER 3 OF 6 HCAPLUS COPYRIGHT 2002 ACS
AN 1995:552010 HCAPLUS
DN 123:91291
TI Optimization of high-performance concrete
AU Larrard, Francois de
CS Division des Materiaux et Structures pour Ouvrages d'Art, Laboratoire Central des Ponts et Chaussees, Paris, Fr.
SO Micromech. Concr. Cem. Compos., Proc. Int. Conf. JMX13, 13th (1993), 45-58. Editor(s): Huet, Christian. Publisher: Presses Polytech. Univ. Romandes, Lausanne, Switz.
CODEN: 61FOAE
DT Conference
LA English
AB Nowadays, concrete can be made with about 4 to 10 different components. The no. of properties to be adjusted has also increased, so that empirical methods are no longer sufficient in concrete mix design. The general approach used at the LCPC for rational mix design used at the Laboratoire Central des Ponts et Chaussees is presented, emphasizing the most recent findings. The main scientific problem lies in establishing anal. relationships between the mix compn. and the engineering properties of concrete. The model used for fresh concrete is the linear packing d. model for grain mixts. (LPDM). The original model gives a prediction of the voids content of a dry particles packing from its grading and from parameters describing the ability of unimodal **aggregates** to pack. An adaptation of this model is used to evaluate the water demand of a concrete having a given consistency. Hardened concrete is described through the Feret's formula, and the inverted peach model (IPM), a refinement of the well-known Hashin model for **composite materials** made of spherical inclusions embedded in a continuous matrix. In the IPM, the basic cell of concrete is a hollow sphere of **aggregate** contg. a paste nucleus, surrounded by an external layer of paste. This "paste skin" stands for the part of the matrix in excess of the min. paste content necessary to fill the **aggregate** voids. The model was first developed to calc. the deformation properties of concrete from those of the phases (such as elastic modulus, shrinkage, creep, or coeff. of **thermal expansion**). But it has recently been found that the thickness of the external paste layer, called the max. paste thickness, is a very significant parameter influencing the compressive strength of concrete (according to the quality of the paste,

described by the water/cement and water/binder ratios). The final step for performing rational concrete mix design is the incorporation of the previous models in software. Then one can conduct mix simulations covering all the important properties of the concrete at the same time. A first version of such software, called BETONLAB, has been developed and will be presented.

L18 ANSWER 4 OF 6 HCAPLUS COPYRIGHT 2002 ACS
AN 1994:441201 HCAPLUS
DN 121:41201
TI The surface morphology and structure of carbon-carbon composites in high-energy sliding contact
AU Yen, Bing K.; Ishihara, Tadashi
CS Mitsubishi Kasei Research Center, Yokohama, 227, Japan
SO Wear (1994), 174(1-2), 111-17
CODEN: WEARAH; ISSN: 0043-1648
DT Journal
LA English
AB The surface morphol. and microstructure of a carbon-carbon **composite material** in sliding contact have been investigated. The carbon-carbon composite sample is made from an org. binder-impregnation process. Chopped carbon fiber felt is impregnated with phenolic resin and pitch. A ring-on-ring specimen configuration with fiber randomly oriented in the plane of sliding is used to simulate aircraft brakes. The relative sliding speed between two composite rings decelerates from an initial speed of 23 m s-1 to a complete stop under a load of 3100 N to simulate a high energy aircraft braking process. Two types of surface morphol. can be distinguished on the sample surface: a dull-looking gray surface area with a machine-finished appearance, and a lustrous black area with a mirror-like polished appearance under room light. The sliding surface on the gray area is rough. Patches of wear debris and wear tracks on top of both the fiber and the matrix are clearly visible. Large blisters formed from the compaction of wear debris are sometimes obsd. on this surface. The sliding surface on the lustrous area is covered with a layer of thin debris film of the order of 1 .mu.m thick. This film is composed of **aggregates** of equiaxial particles and thus exhibits no preferred crystallite orientation on the surface. The existence of two types of surface morphol. is due to a difference in the local contact pressure. In the gray surface area the contact pressure is higher, which leads to a rougher surface without continuous debris film coverage. In the lustrous surface area the contact pressure is lower, which allows the maintenance of a debris film. The difference in the contact pressure is due to the non-uniform frictional heat generation which causes unequal **thermal expansion** of the contact surface as often obsd. in tribol. tests involving high energy dissipation rate.

L18 ANSWER 5 OF 6 HCAPLUS COPYRIGHT 2002 ACS
AN 1989:62709 HCAPLUS
DN 110:62709
TI Cementitious composites containing steel **aggregates** and fibers for molds and tools
IN Double, David D.; Wise, Sean
PA Cemcom Corp., USA
SO Eur. Pat. Appl., 29 pp.
CODEN: EPXXDW
DT Patent
LA English
FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 273181	A2	19880706	EP 1987-117104	19871119
	EP 273181	A3	19890726		
	R: BE, CH, DE, FR, GB, IT, LI, LU, NL, SE				
	US 4780141	A	19881025	US 1986-945632	19861223
	JP 63170252	A2	19880714	JP 1987-278129	19871102
	BR 8706449	A	19880712	BR 1987-6449	19871130
PRAI	US 1986-945632		19861223		
	US 1986-894815		19860808		

AB A cementitious **composite material** comprises a high-strength cement matrix and a filler component comprising metal fibers, which are present from .apprx.5 to <20 wt.% of the wt. of the **composite material**, and an inorg. **aggregate**. The cement matrix contains .gtoreq.1 of portland cement, high aluminous cement, phosphate-modified cement, polymer-treated cement, and cement formed of ceramic oxides. In addn. to the fibers, the composite comprises the cement 20-35, chem. reactive SiO2 particles, 2-10, inorg. oxide particles, that differ from the chem. reactive SiO2 (e.g., Al2O3, ZrO2), 5-25, and water, 5-10 wt.%. A superplasticizer, the Na salt of a formaldehyde condensate with .beta.-naphthalenesulfonic acid, is added to the cement at 0.25-1.5 wt.%. The metal fiber is preferably stainless steel, but other metals such as low C steel can be used. The inorg. **aggregate**, which enhances the strength and thermal properties, increases the compaction of the product, and controls the coeff. of **thermal expansion**, preferably comprises stainless steel and other steel particles which are irregular in shape. The metal **aggregate** particles are employed in a proportion of 30-70 wt.% of the wt. of the **composite material**. These cementitious composites are useful in the manuf. of molds and tools for forming metals and plastics. A low C steel fiber, 2 grades of low C steel wool and 434 stainless steel fiber were used in making the cementitious composites. Of the 4 different metal fiber materials used the 434 stainless steel fibers performed the best. These fibers yielded a mixt. having a compressive strength of 45,000 psi, flexural strength >8000 psi, the lowest shrinkage (0.27%), and the best vacuum integrity (2 mm/15 min).

L18 ANSWER 6 OF 6 HCAPLUS COPYRIGHT 2002 ACS
AN 1987:482762 HCAPLUS
DN 107:82762
TI Cementitious **composite material** with silicon carbide **aggregate**
IN Bright, Randall P.; Double, David D.; Wise, Sean
PA FPC Research, Inc., USA
SO U.S., 4 pp.
CODEN: USXXAM
DT Patent
LA English
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 4666520	A	19870519	US 1985-777324	19850918

AB Title material, for use as a tool, is prepd. by setting a mixt. of portland cement 22-30, chem. active pozzolanic condensed SiO2 fume 3-4, less chem. active, finely divided SiO2 particles 5-20, liq. superplasticizer 1-2, graded 8-100 mesh SiC particles 35-60, and water 5-10 wt.%, in which the graded SiC particles constitute .gtoreq.35% of the **composite material**; the composite has a lower coeff. of **thermal expansion**, a greater **thermal** cond.,

and an increased abrasion resistance vs. a similar material contg. stainless steel particles as main filler. A compn. prepd. from 8-100 mesh SiC 51.9, class H portland cement 25.0, in-U-Sil 12.2, silica fume 3.4, water 6.4, MT 150 1.1, and tri-n-butylphosphate 0.03 wt.% had 7-day and thermal-cycled compressive strength 143 and 228 MPa, resp., flexural strength 17 and 24 MPa, resp., d. 2660 kg/m3, thermal cond. 4.8 W/m-K, **thermal expansion** 4-5/degree .times. 106, modulus of elasticity 67 MPa, sp. heat 1005 J/kg-K, and thermal diffusivity 18.0 .times. 10-7 m2/s vs. 172 and 345, 17 and 28, 3650, 2.7, 11-14, 49, 787, and 9.4 .times. 10-7 for samples with stainless steel filler instead of SiC.

L20 ANSWER 1 OF 12 HCAPLUS COPYRIGHT 2002 ACS
AN 2002:265190 HCAPLUS
DN 136:298567
TI High ceramic fiber volume preform for **metal** matrix **composite material**
IN Kimura, Koichi; Goto, Yoshihiko; Wadasako, Kazushi; Iwata, Koji; Tomosue, Shinya; Kobayashi, Tsuyoshi
PA Nichias Corp., Japan
SO Jpn. Kokai Tokkyo Koho, 7 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2002105610	A2	20020410	JP 2000-296387	20000928

AB A 3-dimensional structured preform is prepd. by using a ceramic fiber and an **inorg**. bider. The fiber, with .gtoreq.85% being in the length range of 10-100 .mu.m, has a wet vol. Vwet of 2-25 cc/10g. Alumina, mullite, and/or silica alumina (with .gtoreq.30% of alumina) are used for the fiber. The preform is suitable for **metal** matrix **composite material** with high Vf value, which has good strength and low **thermal expansion** coeff. Ceramic powder is not used as in conventional methods so that there is no concern about the powder falling out to contaminate a clean room.

L20 ANSWER 2 OF 12 HCAPLUS COPYRIGHT 2002 ACS
AN 2002:256688 HCAPLUS
DN 136:287856
TI Prodn. of printed circuit board with wiring layers, insulator layer in between and inner-via-hole conductive member for elec. connection
IN Suzuki, Takeshi; Ogawa, Tatsuo; Bessho, Yoshihiro; Tomekawa, Satoru; Nakatani, Yasuhiro; Ueda, Yoji; Matsuoka, Susumu; Andoh, Daizo; Echigo, Fumio
PA Matsushita Electric Industrial Co., Ltd., Japan
SO U.S. Pat. Appl. Publ., 22 pp.
CODEN: USXXCO
DT Patent
LA English
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2002038725	A1	20020404	US 2001-928869	20010813
	JP 2002118338	A2	20020419	JP 2000-307310	20001006
	JP 2002141630	A2	20020517	JP 2001-235812	20010803
PRAI	JP 2000-250065	A	20000821		
	JP 2000-307310	A	20001006		

AB A circuit board is configured so as to include .gtoreq.2 wiring layers, an insulator layer for elec. insulation between the wiring layers, and an inner-via-hole conductive member provided in the insulator layer in a thickness direction of the insulator layer, for elec. connection between the wiring layers. The insulator layer is made of a **composite material** contg. an org. resin and a material having a smaller **thermal expansion** coeff. than that of the org. resin, and includes a surface part, a core part, and a surface part laminated in the stated order, the surface part having a high content of the org. resin, the core part having a low content of the org. resin. The wiring

layers have a land portion that is connected with the inner-via-hole conductive member, the land portion being embedded so as to be substantially in contact with the core part, and the inner-via-hole conductive member has a thickness substantially equal to a thickness of the core part. According to this configuration, a part of the **metal** foil is embedded in the insulator layer so as to be in contact with the core layer. Therefore, this makes it possible to provide a circuit board in which portions of the conductive material can be selectively compressed, and which hence is capable of ensuring stable connection between layers.

L20 ANSWER 3 OF 12 HCAPLUS COPYRIGHT 2002 ACS
AN 2001:521245 HCAPLUS
DN 135:115484
TI **Composite materials** for heat-dispersing substrates of semiconductor devices
IN Watabe, Sukeyuki; Okamoto, Kazutaka; Kondo, Yasuo; Abe, Terunobu; Aono, Yasuhisa; Kaneda, Junya
PA Hitachi Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 17 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI JP 2001196513	A2	20010719	JP 2000-9969	20000113

AB The materials comprise **metals** and particulate or rod-like **inorg**. compds. contg. Cu2O 10-55 vol.% and Cu balance, and having **thermal expansion** coeff. of 5 .times. 10-6 .apprx. 17 .times. 10-6/.degree.C and thermal cond. of 100-380 W/m.bul.K.

L20 ANSWER 4 OF 12 HCAPLUS COPYRIGHT 2002 ACS
AN 2001:17803 HCAPLUS
DN 134:74845
TI Aluminum-matrix **composite materials** containing ceramic powders and their manufacture
IN Watanabe, Morimichi; Katsuda, Yuji; Masuda, Masaaki
PA NGK Insulators, Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 15 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI JP 2001002478	A2	20010109	JP 1999-169185	19990616

AB The **composite materials** comprise Al phases, 30-70 wt.% (A) phases having **thermal expansion** coeff. lower than Al, and .ltoreq.1 wt.% **metals** other than Al and **metals** in A and have d. .gtoreq.95% than theor. d. The A phases may contain carbides, nitrides, and/or oxides of Al, Si, or B. The composites are manufd. by prepg. compacts contg. Al powder and low-**thermal expansion** material powder and heating under .ltoreq.10-2 Torr atm. pressure, .gtoreq.50 kg/cm2 axial pressure, and at temp. higher than m.p. of Al. The **composite materials** have high fracture toughness, Young's modulus, and corrosion resistance.

L20 ANSWER 5 OF 12 HCAPLUS COPYRIGHT 2002 ACS

AN 2000:803881 HCAPLUS
DN 133:338626
TI **Composite material** for semiconductor devices and electrostatic adsorbers
IN Kondo, Yasuo; Okamoto, Kazutaka; Abe, Terunobu; Kaneda, Junya; Aono, Yasuhisa; Saito, Ryuichi; Koike, Yoshihiko
PA Hitachi, Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 20 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2000313905	A2	20001114	JP 1999-121285	19990428

AB A **composite material** manufd. by isotropic pressing and sintering consists of **metal** particles and **inorg**. particles having a **thermal expansion** coeff. lower than that of the **metal**. Of the **inorg**. particles, 50-95% are connected to each other forming lumps of complex shape. The prefered **metal** and **inorg**. material are Cu and Cu oxide. The composite is suitable for heat sinks of semiconductor devices or electrode sheets of electrostatic adsorbers.

L20 ANSWER 6 OF 12 HCAPLUS COPYRIGHT 2002 ACS
AN 2000:803880 HCAPLUS
DN 133:338625
TI **Composite material**, manufacture thereof, and semiconductor device
IN Kaneda, Junya; Kondo, Yasuo; Okamoto, Kazutaka; Abe, Teruyoshi; Aono, Yasuhisa
PA Hitachi, Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 15 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2000313904	A2	20001114	JP 1999-121280	19990428

AB A composite is manufd. by mixing a **metal** powder and an **inorg**. material powder having **thermal expansion** coeff. lower than that of the **metal** and passing the mixt. between the rolls, thereby subjecting the mixt. to plastic processing simultaneously with sintering. Preferably, 50-95% of the **inorg**. particles are connected to each other, forming lumps of irregular shape. The composite with high thermal cond., low **thermal expansion** coeff., and high plastic processibility is suitable, e.g., for heat sinks of semiconductor devices.

L20 ANSWER 7 OF 12 HCAPLUS COPYRIGHT 2002 ACS
AN 2000:665644 HCAPLUS
DN 133:226304
TI **Metal** matrix **composite material**, process for its production and use
IN Okamoto, Kazutaka; Kondo, Yasuo; Abe, Teruyoshi; Aono, Yasuhisa; Kaneda, Junya; Saito, Ryuichi; Koike, Yoshihiko
PA Hitachi, Ltd., Japan
SO Eur. Pat. Appl., 27 pp.

CODEN: EPXXDW
DT Patent
LA English
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 1036849	A2	20000920	EP 2000-104647	20000303
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
	JP 2000265227	A2	20000926	JP 1999-69540	19990316
PRAI	JP 1999-69540	A	19990316		

AB Provided is a **composite material** excellent in plastic workability, a method of producing the **composite material**, a heat-radiating board of a semiconductor equipment, and a semiconductor equipment to which this heat-radiating board is applied. This **composite material** comprises a **metal** and an **inorg**. compd. formed to have a dendritic shape or a bar shape. In particular, this **composite material** is a copper **composite material**, which comprises 10 to 55 vol.% cuprous oxide (Cu2O) and the balance of copper (Cu) and incidental impurities and has a coeff. of **thermal expansion** in a temp. range from a room temp. to 300.degree.C of from 5 .times. 10-6 to 17 .times. 10-6/.degree.C and a thermal cond. of 100 to 380 W/m .cntdot.k. This **composite material** can be produced by a process comprising the steps of melting, casting and working and is applied to a heat-radiating board of a semiconductor article.

L20 ANSWER 8 OF 12 HCAPLUS COPYRIGHT 2002 ACS
AN 2000:402054 HCAPLUS
DN 133:7980
TI **Composite material** containing **metal** matrix and dispersed particles and use thereof
IN Kondo, Yasuo; Kaneda, Junya; Aono, Yasuhisa; Abe, Teruyoshi; Ingaki, Masahisa; Saito, Ryuichi; Koike, Yoshihiko; Arakawa, Hideo
PA Hitachi, Ltd., Japan
SO PCT Int. Appl., 53 pp.
CODEN: PIXXD2
DT Patent
LA Japanese
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2000034539	A1	20000615	WO 1998-JP5527	19981207
	W: CN, JP, KR, RU, US				
	RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
	EP 1167559	A1	20020102	EP 1998-957211	19981207
	R: DE, FR, GB, IT, NL, SE				
PRAI	WO 1998-JP5527	W	19981207		

AB A **composite material** having a high thermal cond., a low coeff. of **thermal expansion**, and a high plastic workability and the use thereof in the fields of semiconductors and so forth. Specifically, a **composite material** comprising a **metal** and particles of an **inorg**. compd. having a coeff. of **thermal expansion** lower than that of the **metal**, characterized in that the particles are dispersed in the form of a lump having a complicated configuration wherein at least 95% of the particles are connected to one another. It is possible to obtain a **composite material** which contains 20 to 80 vol.% of

copper oxide, the balance being copper, has a coeff. of **thermal expansion** of 5x10-6 to 14x10-6/C in the temp. range of room temp. to 300 >C and a thermal cond. of 30 to 325 W/m.K, and can be applied to heat sinks of semiconductor devices and dielec. plates of electrostatic adsorbers.

RE.CNT 18 THERE ARE 18 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L20 ANSWER 9 OF 12 HCAPLUS COPYRIGHT 2002 ACS
AN 1997:186331 HCAPLUS
DN 126:172781
TI Manufacture of resin prepregs with low **thermal expansion** coefficient and high heat resistance by using reinforcements containing **inorganic** particles
IN Komori, Kyotaka; Tamya, Hiroki; Nozue, Akyoshi; Yamakawa, Seishiro
PA Matsushita Electric Works Ltd, Japan
SO Jpn. Kokai Tokkyo Koho, 8 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 09003217	A2	19970107	JP 1995-151850	19950619

AB The prepregs are manufd. by impregnation of resin varnishes into reinforcements comprising strands of monofilaments, in which 1-30 parts (of the reinforcements) of **inorg**. particles (particle size .ltoreq.1000 nm) are added prior to impregnation, at 1-300 torr followed by drying. Preferably, the impregnation are carried out under ultrasonic vibration or vibration of 15-30 Hz by springs. Preferably, the reinforcements are immersed in vacuum-defoamed solvents and then immersed in vacuum-defoamed resin varnishes. A soln. contg. Snowtex OL (colloidal silica, av. particle size 45 nm) was impregnated into a glass cloth and the glass cloth was dried and heat treated. Then, a soln. contg. KBM 573 (aminosilane-based coupling agent) was impregnated into the coated glass cloth to give a reinforcement (**inorg**. particle content 19 parts of 100 parts of the reinforcement). An epoxy resin varnish was impregnated into the surface-treated glass cloth at 20 torr and dried to give a prepreg, which was laminated and press molded to give a **composite material** (resin content 29%) showing **thermal expansion** coeff. in the longitudinal and transverse directions of 9.4 and 10.7 ppm/.degree., resp.

L20 ANSWER 10 OF 12 HCAPLUS COPYRIGHT 2002 ACS
AN 1996:686773 HCAPLUS
DN 125:331123
TI Curable poly(phenylene ether) compositions and their **composite materials**, cured products, and laminates with improved dimensional stability, chem. and heat resistance, and layer adhesion
IN Katayose, Teruo; Ishii, Yoshuki
PA Asahi Chemical Ind, Japan
SO Jpn. Kokai Tokkyo Koho, 10 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 08239567	A2	19960917	JP 1995-63537	19950228

AB The curable compns. for the cured products comprise (A) reaction products of poly(phenylene ethers) and unsatd. carboxylic acids or anhydrides, (B) triallyl isocyanurate and/or triallyl cyanurate, (C) epoxy resins, (D) **inorg**. fillers, and optionally (E) dicumyl peroxide and/or .alpha.,.alpha.'-bis(tert-butylperoxy-m-isopropyl)benzene at ratio A 98-40 parts and B 2-60 parts (for A + B = 100 parts), A + B = 99-10 parts and C 1-99 parts (for A + B + C = 100 parts), A + B + C = 99-10 parts and D 1-90 parts (for A + B + C + D = 100 parts), and E 0.1-10 parts (for A + B = 100 parts). The **composite materials** for the cured products comprise 95-10 parts the compns. and 5-90 parts substrates (total 100 parts). The laminates comprise the cured **composite materials** and **metal** foils. The laminates are useful for printed circuit boards. Thus, 100 parts poly(2,6-dimethyl-1,4-phenylene ether) and 1.5 parts maleic anhydride were allowed to react at 300.degree. in the presence of Perhexa 25B and extruded, then 50 parts the reaction product was blended with TAIC 15, AER 331 50, Perbutyl P 2.0, 2E1MZ 2.0, and SiO2 5 parts, dissolved or dispersed in CHCl3, poured onto a Teflon plate, film-formed, and cured for 60 min at 200.degree. to give test pieces with dielec. const. 3.0, tan.delta. 0.006, good resistance to Cl2C:CHCl and solder **heat**, and linear **expansion** coeff. 75 .times. 10-5, 70 .times. 10-5, and 71 .times. 10-5 in x-, y-, and z-direction, resp.

L20 ANSWER 11 OF 12 HCAPLUS COPYRIGHT 2002 ACS
AN 1992:199153 HCAPLUS
DN 116:199153
TI **Metal**-based **composite material** disk brake rotor
IN Ichikawa, Shigeru; Miyake, Yoji; Miura, Hirohisa; Okamoto, Mamoru; Tsuchiya, Shoichi
PA Toyota Motor Corp., Japan
SO Jpn. Kokai Tokkyo Koho, 4 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 03189430	A2	19910819	JP 1989-329900	19891220

AB The title disk brake rotor is formed from **metal**-based **composite material** consists of an Al alloy as matrix, 10-50 vol.% **inorg**. material having **thermal expansion** coeff. less than that of the Al alloy as reinforcing material (e.g., SiC particles or whiskers), and wear-resistant coating layers having **thermal expansion** coeff. less than that of the Al alloy coated on pad-contacting sliding surfaces(s) of the disk brake rotor. Thus, an Al alloy-based **composite material** contg. 20 vol.% SiC particles (av. size 10 .mu.m) was cast and machined to form rotor shape, and flame-spray coated with Fe-Cr-Cu alloy (30 wt.% Cr, 50 wt.% Cu, minute quantity of Ni, Si, C, Mn and S, and the balance of Fe) on its pad-contacting sliding surface) to form the disk brake rotor.

L20 ANSWER 12 OF 12 HCAPLUS COPYRIGHT 2002 ACS
AN 1987:501342 HCAPLUS
DN 107:101342
TI Reinforced materials resistant to thermal stress
IN Tanaka, Nobuhiko
PA Toshiba Corp., Japan
SO Jpn. Kokai Tokkyo Koho, 4 pp.

CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 62083437	A2	19870416	JP 1985-221765	19851007

AB The reinforced materials, e.g. nozzles and unions of pipings for nuclear power plants, have a structurally noncontinuous portion reinforced with granular or needle-like **metal** or nonmetal as a core. The **thermal expansion** coeff. of the core is different from that of the **metal** matrix for forming interfacial gaps between the core and matrix on heating. The concn. of thermal stress at the noncontinuous portion is thus suppressed to prevent fatigue. A Y shape pipe union, for example, has **inorg**. fibers as a core in a **metal** matrix.

L22 ANSWER 1 OF 5 HCAPLUS COPYRIGHT 2002 ACS
AN 2000:64594 HCAPLUS
DN 132:197440
TI Suppression effect of fine Al2O3 particulates on aging kinetics in a 6061 matrix **composite material**
AU Gaohui, Wu; Senlin, Ma; Yongchun, Zhao; Dezhuang, Yang
CS Harbin Institute of Technology, School of Materials Science and Engineering, Harbin, 150001, Peop. Rep. China
SO Transactions of Nonferrous Metals Society of China (1999), 9(4), 818-821
CODEN: TNMCEW; ISSN: 1003-6326
PB Transactions of Nonferrous Metals Society of China
DT Journal
LA English
AB Aging behaviors of submicron Al2O3p/6061 composite were studied by **Vickers hardness** measurement and transmission electron microscope observation. Microstructure and aging characteristic of the composite are presented. Addn. of fine Al2O3 particulates would strongly restrain the pptn. and reduce the thermal mismatch dislocation d. due to the difference of coeff. of **thermal expansion** between the matrix and the reinforcement.
RE.CNT 12 THERE ARE 12 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L22 ANSWER 2 OF 5 HCAPLUS COPYRIGHT 2002 ACS
AN 1992:656502 HCAPLUS
DN 117:256502
TI Development and utilization of inorganic fiber and noncrystalline high-performance materials. VII. Production of **composite materials** and properties. Application of silicon oxycarbide fiber to **composite material**
AU Suzuki, Yoshikazu; Shimokawa, Katsuyoshi; Unuma, Hidero; Ueda, Yoshinobu; Kawabata, Junichi
CS Gov. Ind. Dev. Lab., Hokkaido, Sapporo, 062, Japan
SO Hokkaido Kogyo Kaihatsu Shikensho Hokoku (1992), 55, 42-8
CODEN: HKKHAG; ISSN: 0441-0734
DT Journal
LA Japanese
AB Si-O-C fiber prepd. from rice husk was used to prep. **composite materials** with SiO2 glass and Al matrixes. The glass **composite material** produced by the sol-gel method using Si(OMe)4 as a raw material in the presence of the fiber followed by hot-isostatic pressing of the calcined composite gel showed higher Knoop hardness and fracture toughness and lower **thermal expansion** coeff. compared to that of unreinforced material. The **composite material** produced by uniaxial pressing at high temp. of the mixt. of the fiber (low fiber content) and Al powder showed higher **Vickers hardness** and tensile and bending strengths and lower **thermal expansion** coeff. compared to that of the unreinforced material.

L22 ANSWER 3 OF 5 HCAPLUS COPYRIGHT 2002 ACS
AN 1987:442220 HCAPLUS
DN 107:42220
TI Roller and its fabrication
IN Okaya, Kan; Kashiyama, Setsuo; Suzuki, Kinuko
PA Mitsubishi Rayon Co., Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 4 pp.

CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 61194197	A2	19860828	JP 1985-35592	19850225
	JP 03012541	B4	19910220		

AB Rollers based on **composite materials**, including a C fiber cylinder, and their fabrication are described. The cylinder may comprise 3 layers of C-fiber-contg. material, the inner most and outermost layers being arranged so that the fibers are oriented at .apprx.90.degree. to the cylinder axis while those in the middle layer are oriented at 5-45.degree. to the cylinder axis. The cylinder may have a rigidity in the axial direction of 6.5 ton/mm2, and coeffs. of **thermal expansion** in the radial and axial directions of <2 .times. 10-5/.degree. and <6 .times. 10-5/.degree., resp., over the range -30 to 130.degree.. The rollers comprise a cylinder, an elec. conductive layer formed on the cylinder surface, a layer of Cu or Ni formed (e.g., by electroplating) on the surface of the conductive layer, and a layer of Cr. The title roller weighs only .apprx.45% of an Al roller and is stronger mech. than an Al roller. Thus, 6000 C fiber strings (av. diam. 8 .mu.m) were immersed in an epoxy resin and used to form a 5 mm thick 3-layer C fiber cylinder contg. 58% vol. of resin (inside diam. 70, outside diam. 80 mm). An epoxy resin contg. Ag powder was coated on the cylinder so that the surface became elec. conductive. The surface of the cylinder was then successively electroplated with Cu and Cr. The **Vickers hardness** of the surface of the roller was 800 and the roller had good antifriction properties.

L22 ANSWER 4 OF 5 HCAPLUS COPYRIGHT 2002 ACS
AN 1987:8722 HCAPLUS
DN 106:8722
TI Refractory **composite material**
IN Warren, James W.
PA Refractory Composites, Inc., USA
SO Eur. Pat. Appl., 68 pp.
CODEN: EPXXDW
DT Patent
LA English
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 200568	A2	19861105	EP 1986-303378	19860502
	EP 200568	A3	19870826		
	R: AT, BE, CH, DE, FR, GB, IT, LI, LU, NL, SE				
	CA 1286549	A1	19910723	CA 1986-506796	19860416
	JP 62007689	A2	19870114	JP 1986-102878	19860502
PRAI	US 1985-729691		19850502		

AB A refractory composite article is manufd. from a porous substrate, e.g., carbonized felt or pitch fibers with a 1st **thermal expansion** coeff. (TEC) by depositing an impermeable coating with a 2nd TEC to give free movement of the coating relative to the substrate, and depositing a permeable coating or matrix of TEC close to the 2nd TEC over the impermeable coating. A 2nd impermeable coating, also with essentially the 2nd TEC above, may be added over the permeable one for, e.g., oxidn. protection. The permeable matrix may be a non-stoichiometric metal compd. in which an excess of metal decreases, and a deficiency of metal increases the permeability, which can be varied at different

thicknesses within the matrix. A substrate of carbonized rayon felt (d. 0.1 g/cm3, fiber vol. .apprx.7%) was thermally stabilized and then heated at 700-1000.degree. and coated on the fiber surfaces throughout the piece with 1000-5000 .ANG. Si3N4 (by chem.-vapor deposition using HSiCl2 and NH3). The substrate was then heated at 900-1200.degree. (preferably 1040.degree.) and treated with MeSiCl3 under described conditions for 25 h to give a composite of d. 1.50 g/cm3. The composite was vacuum-impregnated with 12% B2O3-doped Si(OEt)4 and hydrolyzed to give a borosilicate coating on the SiC, and finally was heated at 1200.degree. to densify and flow the glaze into a 1-5 .mu. coating on all exposed surfaces. The resulting composite had **Vickers Hardness** No. (HVn) 1800, and other composites according to the invention had HVn 2860-4120.

L22 ANSWER 5 OF 5 HCAPLUS COPYRIGHT 2002 ACS
AN 1976:585973 HCAPLUS
DN 85:185973
TI Paramagnetic composite metal oxides having spinel structures
IN Tabaru, Kazunori
PA Hitachi Metals, Ltd., Japan
SO Japan. Kokai, 5 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 51092098	A2	19760812	JP 1975-16259	19750210
	JP 55016102	B4	19800428		

AB Spinel-structured metal oxides which exhibit paramagnetism at temps. .ltoreq. -30.degree. and have Jahn-Teller transformation temp. .gtoreq.1300.degree. are useful as substrates for magnetic heads, microwave integrated circuits, and Hall elements. The metal oxides exhibit good compatibility with the various magnetic ferrites, etc., and the **composite material** prepd. by using the metal oxides as the substrate exhibits good mech. and magnetic properties. The Jahn-Teller transition temp. can be increased by controlling the distribution of different ions within the crystal lattice. Thus, a mixt. of ZnO, NiO, and MnCO3 (1:1:1 mole ratio) was presintered at 800-900.degree., crushed, compacted at 2 ton/cm2, and sintered at .ltoreq.1200.degree. to give spinel-structured ZnNiMnO4 whose Curie temp., av. **thermal expansion** coeff., and **Vickers hardness** were 170.degree.K, 8.2 .times. 10-6/degree, and 600 kg/mm2, resp. The sintered ZnNiMnO4 was bonded with Ni-Zn ferrite (**thermal expansion** coeff. = 8.5 .times. 10-6/degree) by using a glass binder without cracking or changing the magnetic properties of the Ni-Zn ferrites.

L25 ANSWER 1 OF 2 HCAPLUS COPYRIGHT 2002 ACS
AN 1994:258332 HCAPLUS
DN 120:258332
TI Sliding contact characteristics between self-lubricating **composite materials** and **copper**
AU Watanabe, Yoshitada
CS Dep. Electr. Eng., Tokyo, 163, Japan
SO IEEE Trans. Compon., Hybrids, Manuf. Technol. (1993), 16(4), 442-8
CODEN: ITTEDR; ISSN: 0148-6411
DT Journal
LA English
AB The lubricating performances of **composite materials** contg. solid lubricants such as MoS2, WS2, etc., are so excellent that their effects as sliding contacts are being expected and are being widely applied. However, few presentations were made on the details of the characteristics of metals contg. such solid lubricants. As the results of the previous investigations made on the **composite material** (CM-1) contg. 20% of MoS2 and 20% of WS2, it was found that whereas the coeff. of friction was lowered to that of between pure **copper** metals by the incorporation of solid lubricants, contact resistance was increased by 1-2 orders of magnitude according to the effect of the existence of **copper oxide** film. Coeffs. of friction and contact resistivities of 2 types of **composite materials** CM-4 (WS2 8%) and CM-5 (WS2 45%), of which resistivities were low, were measured simultaneously by using the exptl. tester in this paper. As the result, the contact resistances were reduced as much to 1/10 compared to that of CM-1. Although coeffs. of friction were obtained at 0.4-0.5, which were slightly higher than that of CM-1 (0.3), it was found that those **composite materials** could be applied to the sliding elec. contacts where occurrence of welding must be prevented by lowering frictional force and wear rate. It was further found that CM-5 indicated better lubricating performances than CM-4 and was more suitable as the material for sliding elec. contacts.

L25 ANSWER 2 OF 2 HCAPLUS COPYRIGHT 2002 ACS
AN 1986:483793 HCAPLUS
DN 105:83793
TI **Composite material** reinforced with alumina-silica fibers including mullite crystalline form
IN Dohnomoto, Tadashi; Kubo, Masahiro; Kito, Haruo
PA Toyota Motor Co., Ltd. , Japan; Isolite Babcock Refractories Co., Ltd.
SO U.S., 23 pp.
CODEN: USXXAM
DT Patent
LA English
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 4590132	A	19860520	US 1985-726358	19850423
	AU 8541719	A1	19860501	AU 1985-41719	19850426
	AU 573336	B2	19880602		
	CA 1239297	A1	19880719	CA 1985-480560	19850502
	EP 182959	A1	19860604	EP 1985-105698	19850509
	EP 182959	B1	19880810		
	R: DE, FR, GB, IT, SE				
	IN 164532	A	19890401	IN 1985-CA359	19850509
PRAI	JP 1984-225011		19841025		

AB The composites have .gtoreq.0.5 vol.% reinforcing Al2O3-SiO2 fibers in a

matrix of Al, Mg, **Cu**, Zn, Pb, Sn, or their alloys. The fibers contain SiO_2 .apprx.35-65, Al_2O_3 .apprx.35-65, and CaO, MgO, Na_2O, Fe_2O_3, Cr_2O_3, ZrO_2, TiO_2, PbO, SnO_2, ZnO, MoO_3, NiO, K_2O, MnO_2, B_2O_3, V_2O_5, **CuO**, and/or Co_3O_4) <10%, with mullite phase >15 and nonfibrous particles with diam. .gtoreq.150.mu. <5%. Thus, composites manufd. from AC8A Al alloy reinforced with Al_2O_3-SiO_2 fibers showed low wear, **Vickers hardness** .gtoreq.1000, and bending strength 45 at room temp. and 35 kg/mm2 at 250.degree.. Composites from Al-4.5 **Cu**-0.4% Mg alloy whose preforms had 46 or 58 vol.% fibers had tensile strength 58 or 66 kg/mm2, vs. 33 kg/mm2 for the alloy.

L26 ANSWER 1 OF 1 HCAPLUS
AN 1987:442220 HCAPLUS
DN 107:42220
TI Roller and its fabrication
IN Okaya, Kan; Kashiyama, Setsuo; Suzuki, Kinuko
PA Mitsubishi Rayon Co., Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 4 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 61194197	A2	19860828	JP 1985-35592	19850225
	JP 03012541	B4	19910220		

AB Rollers based on **composite materials**, including a C fiber cylinder, and their fabrication are described. The cylinder may comprise 3 layers of C-fiber-contg. material, the inner most and outermost layers being arranged so that the fibers are oriented at .apprx.90.degree. to the cylinder axis while those in the middle layer are oriented at 5-45.degree. to the cylinder axis. The cylinder may have a rigidity in the axial direction of 6.5 ton/mm2, and coeffs. of thermal expansion in the radial and axial directions of <2 .times. 10-5/.degree. and <6 .times. 10-5/.degree., resp., over the range -30 to 130.degree.. The rollers comprise a cylinder, an elec. **conductive layer** formed on the cylinder surface, a layer of Cu or Ni formed (e.g., by electroplating) on the surface of the **conductive layer**, and a layer of Cr. The title roller weighs only .apprx.45% of an Al roller and is stronger mech. than an Al roller. Thus, 6000 C fiber strings (av. diam. 8 .mu.m) were immersed in an epoxy resin and used to form a 5 mm thick 3-layer C fiber cylinder contg. 58% vol. of resin (inside diam. 70, outside diam. 80 mm). An epoxy resin contg. Ag powder was coated on the cylinder so that the surface became elec. conductive. The surface of the cylinder was then successively electroplated with Cu and Cr. The **Vickers hardness** of the surface of the roller was 800 and the roller had good antifriction properties.

L28 ANSWER 1 OF 21 HCAPLUS COPYRIGHT 2002 ACS
AN 2000:226992 HCAPLUS
DN 133:7733
TI Development of age-hardening active brazes for the manufacture of high-performance components in injection casting machines
AU Lugscheider, E.; Buschke, I.; Aulerich, M.; Broich, U.; Haupt, U.; Sikora, M.; Reinkensmeier, I.
CS Lehr- und Forschungsgebiet Werkstoffwissenschaften der RWTH-Aachen, Aachen, Germany
SO Werkstoffwoche '98, Band VI: Symposium 8, Metalle; Symposium 14, Simulation Metalle, Munich, Sept., 1998 (1999), Meeting Date 1998, 345-350. Editor(s): Kopp, Reiner. Publisher: Wiley-VCH Verlag GmbH, Weinheim, Germany.
CODEN: 68TLAM
DT Conference
LA German
AB To improve abrasion resistance of reverse-current stoppers in injection molding machines, a new material concept was established based on the use of a ceramic metal composite coating and its realization via the active braze technol. Al2O3- and ZrO2-based ceramics were examd. as **composite materials**. Their processing via an active braze process was studied using the following steel substrates: 155CrV12Mo1, 39CrMo13V9, and NiMo16Cr16Ti. The new developed braze alloys based on CuSn(In, Al)1-10Ti and were characterized by **Vickers' hardness**. All examd. braze alloys, except CuAl10Ti2, met requirements regarding torsion and shear stresses. Finite element simulations revealed ZrO2-based ceramic as more suited with respect to residual stress during active brazing.
RE.CNT 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L28 ANSWER 2 OF 21 HCAPLUS COPYRIGHT 2002 ACS
AN 1997:148292 HCAPLUS
DN 126:228180
TI Aging process of TiC particle dispersed Al-**Cu** and Al-**Cu**-Mg **composite materials**
AU Ikeno, Susumu; Teraki, Takeshi; Matsuda, Kenji; Anada, Hiroshi; Uetani, Yasuhiro
CS Fac. Eng., Toyama Univ., Toyama, Japan
SO Keikinzoku (1997), 47(1), 28-33
CODEN: KEIKA6; ISSN: 0451-5994
PB Keikinzoku Gakkai
DT Journal
LA Japanese
AB Aging processes of TiC-reinforced Al-4.0Cu, Al-4.3Cu-1.1%Mg and Al-4.3Cu-1.8%Mg alloys were investigated by **Vickers hardness**, elec. resistivity measurement and transmission electron microscope observation. When TiC particles are dispersed into an Al-4.0% **Cu** alloy at a const. fraction of 4 vol.%, aging time to reach a max. hardness is shortened at 423 K aging. On the contrary, at 473 K aging, the time is more prolonged than that in the matrix alloy. Coarsened .theta.' phase ppts. on the dislocations are obsd. at the early stage of aging in the **composite materials**. At a peak aging condition, GP zones and almost identical size and d. of the .theta.' ppts. are distributed in both matrix alloy and **composite materials**. Aging curves of the small amt. Ti added alloy show almost a similar tendency as those of the **composite**

materials. When Al-**Cu**-Mg alloys, having compns. in which GPB zones and the S' intermediate phase are formed during aging, are used as the matrix alloy, the **composite materials** produce the same types as the matrix alloy. In this case, both the Ti added alloy and **composite materials** also give the almost equal time to reach a max. hardness at 473 K aging.

L28 ANSWER 3 OF 21 HCAPLUS COPYRIGHT 2002 ACS
AN 1997:7450 HCAPLUS
DN 126:49722
TI Effect of manufacturing technology on microstructure and properties of **Cu**-Al2O3 **composite material**
AU Li, Yutong; Dong, Zhizhong; Qi, Zengsheng
CS Department of Materials, Tianjin University, Tianjin, 300072, Peop. Rep. China
SO Fuhe Cailiao Xuebao (1996), 13(2), 42-47
CODEN: FCXUEC; ISSN: 1000-3851
PB Fuhe Cailiao Xuebao Bianjibu
DT Journal
LA Chinese
AB A process for manuf. of **Cu**-Al2O3 composite through inner oxidn. of water-atomized **Cu**-0.31% Al alloy was reported. The process comprises water atomizing to obtain powd. **Cu**-0.31% Al alloy having particle size <74 .mu.m, isostatic press forming, sintering, hot pressing, and cold rolling. The manufd. composite showed a d. 8.8 g/cm3, tensile strength 608 MPa, **Vickers hardness** 529 MPa, and resistivity 2.2 .mu..OMEGA.-cm. TEM examn. showed that the formed .gamma.-Al2O3 grains have a size of 150 .ANG. and are well distributed in the **Cu** matrix with a sepn. between grains of 200 .ANG..

L28 ANSWER 4 OF 21 HCAPLUS COPYRIGHT 2002 ACS
AN 1996:123593 HCAPLUS
DN 124:208701
TI Age-precipitation in Al2O3 particle/Al-**Cu** alloy and SiC particle/Al-**Cu**-Mg alloy **composite materials**
AU Ikeno, Susumu; Furuta, Katsuya; Teraki, Takeshi; Matsuda, Kenji; Anada, Hiroshi; Uetani, Yasuhiro
CS Dep. Mater. Sci. Eng., Toyama Univ., Toyama, Japan
SO Keikinzoku (1996), 46(1), 9-14
CODEN: KEIKA6; ISSN: 0451-5994
DT Journal
LA Japanese
AB In order to compare with the aging processes of alumina particle dispersed Al-**Cu**-Mg alloy composites which was revealed previously, those of alumina particle dispersed Al-4.0 mass%**Cu** alloy composites and SiC particle dispersed Al-4.1 mass%**Cu**-1.6 mass%Mg alloy composites were investigated by micro-**vickers hardness** test, elec. resistivity measurement and transmission electron microscope observation. When alumina particle sizes were differed from 1 to 15 .mu.m at const. vol. fraction as 5 vol%, both the GP zone and .theta.' intermediate ppts. were appeared during aging. And the time required to make a max. by aging was not changed with alumina particle size. But when the vol. fraction of alumina particles increased, the time to reach max. hardness by aging obviously decreased. Then the effects of alumina particle addn. to Al-**Cu** alloy were the acceleration of aging process. At SiC particle dispersed **composite materials**, S' intermediate ppts., rod-like .theta.' intermediate ppts. and rectangular shaped .sigma. phases coexisted at relatively later stage of aging. The time to reach max. hardness by aging of the composites was

retarded as compared with that of mother alloy. Then the effects of SiC particle addn. to Al-**Cu**-Mg alloy were the retardation of aging process.

L28 ANSWER 5 OF 21 HCAPLUS COPYRIGHT 2002 ACS
AN 1995:682383 HCAPLUS
DN 123:90240
TI Friction-assisted extrusion of thin strips made of **copper** and aluminum **composite material**
AU Nakamura, Tamotsu; Tanaka, Shigekazu; Hiraiwa, Masashi; Imaizumi, Haruki; Tomizawa, Yasuji
CS Eng. Coll., Shizuoka Univ., Hamamatsu, Japan
SO Nippon Kikai Gakkai Ronbunshu, C-hen (1995), 61(584), 1613-17
CODEN: NKCHDB; ISSN: 0387-5024
DT Journal
LA Japanese
AB The friction-assisted extrusion of thin strips, developed by the authors, was applied to the prodn. of **copper** and aluminum composite thin strips. The composite thin strips which are claddings with 2 and 3 layers of **copper** and aluminum and 0.25 .apprx. 1 mm in thickness could be extruded successfully from block metals with the extrusion ratio of 10 .apprx. 40 and punch pressure ranging from about 0.6 to 1.1 GPa. Composite thin strips which are made of complex phases of **copper** and aluminum and are 0.05 .apprx. 1 mm in thickness could be extruded directly from the powder mixt. of **Cu** and Al with the extrusion ratio of 5 .apprx. 200 and the punch pressure of 0.3 .apprx. 1.2 GPa. The thin strips as extruded from the metal powders showed **Vickers hardness** HV increasing with the mixt. ratio of **copper** powder and the extrusion ratio within a range from 50 to 240. The tensile strength Sr of the thin strips as extruded from composite metal powders was 290 MPa at max. and was increased to 340 MPa by heat treatment for 1 h at 400.degree.C.

L28 ANSWER 6 OF 21 HCAPLUS COPYRIGHT 2002 ACS
AN 1994:258332 HCAPLUS
DN 120:258332
TI Sliding contact characteristics between self-lubricating **composite materials** and **copper**
AU Watanabe, Yoshitada
CS Dep. Electr. Eng., Tokyo, 163, Japan
SO IEEE Trans. Compon., Hybrids, Manuf. Technol. (1993), 16(4), 442-8
CODEN: ITTEDR; ISSN: 0148-6411
DT Journal
LA English
AB The lubricating performances of **composite materials** contg. solid lubricants such as MoS2, WS2, etc., are so excellent that their effects as sliding contacts are being expected and are being widely applied. However, few presentations were made on the details of the characteristics of metals contg. such solid lubricants. As the results of the previous investigations made on the **composite material** (CM-1) contg. 20% of MoS2 and 20% of WS2, it was found that whereas the coeff. of friction was lowered to that of between pure **copper** metals by the incorporation of solid lubricants, contact resistance was increased by 1-2 orders of magnitude according to the effect of the existence of **copper** oxide film. Coeffs. of friction and contact resistivities of 2 types of **composite materials** CM-4 (WS2 8%) and CM-5 (WS2 45%), of which resistivities were low, were measured simultaneously by using the exptl. tester in this paper. As the result, the contact resistances were reduced as much to

1/10 compared to that of CM-1. Although coeffs. of friction were obtained at 0.4-0.5, which were slightly higher than that of CM-1 (0.3), it was found that those **composite materials** could be applied to the sliding elec. contacts where occurrence of welding must be prevented by lowering frictional force and wear rate. It was further found that CM-5 indicated better lubricating performances than CM-4 and was more suitable as the material for sliding elec. contacts.

L28 ANSWER 7 OF 21 HCAPLUS COPYRIGHT 2002 ACS
AN 1990:501751 HCAPLUS
DN 113:101751
TI Development of new alumina **composite materials** produced from sputter-coated particles
AU Takeshima, Eiki; Gonoi, Kaoru; Fujii, Takahiro; Sakakura, Akira
CS Nisshin Steel Co., Ltd., Ichikawa, 272, Japan
SO Hyomen Gijutsu (1990), 41(5), 538-44
CODEN: HYGIEX
DT Journal
LA Japanese
AB A new sputtering app. was assembled to coat Al2O3 particles with Ti. The coated particles were further coated with **Cu** by electroless coating. The double coated particles were molded and sintered in the liq. phase, yielding elaborate **composite materials** in which Al2O3 particles were homogeneously and densely dispersed. The Al2O3 particles in these **composite materials** had high adhesive bonding strength to the **Cu** matrix. The no. of pores in the composites was decreased and the composites had high **Vickers** ' **hardness**.

L28 ANSWER 8 OF 21 HCAPLUS COPYRIGHT 2002 ACS
AN 1989:414349 HCAPLUS
DN 111:14349
TI Iron-covered **composite material** and its manufacturing
IN Kubota, Setsu; Yoshimura, Shunichi
PA Totoku Electric Co., Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 4 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 01017892	A2	19890120	JP 1987-175446	19870714
	JP 05071677	B4	19931007		
	JP 06049685	A2	19940222	JP 1991-314215	19911128
	JP 07088599	B4	19950927		

PRAI JP 1987-175446 19870714
AB The title material comprises electrolytic Fe (which has a purity .gtoreq.99.97%, C content 20-150 ppm, and O content .ltoreq.40 ppm, **Vickers hardness** .ltoreq.250) on a metal core for plastic working. The title method involves electroplating the above Fe, and hot or cold plastic working to obtain a desired shape.

L28 ANSWER 9 OF 21 HCAPLUS COPYRIGHT 2002 ACS
AN 1989:32489 HCAPLUS
DN 110:32489
TI Conductive **composite material**, its preparation, and electric contact material obtained from it
PA Matsushita Electric Works, Ltd., Japan; Unitika Ltd.

SO Ger. Offen., 11 pp.
CODEN: GWXXBX
DT Patent
LA German
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	DE 3810218	A1	19881006	DE 1988-3810218	19880325
	DE 3810218	C2	19930617		
	DE 3810218	C3	19971204		
	JP 63238229	A2	19881004	JP 1987-70683	19870325
	JP 05063535	B4	19930910		
	JP 63238230	A2	19881004	JP 1987-70694	19870325
	JP 05014779	B4	19930225		
	GB 2203167	A1	19881012	GB 1988-6756	19880322
	GB 2203167	B2	19901128		
	US 4911769	A	19900327	US 1988-171700	19880322
	FR 2613117	A1	19880930	FR 1988-3980	19880325
	US 5022932	A	19910611	US 1990-468210	19900122
PRAI	JP 1987-70683		19870325		
	JP 1987-70694		19870325		
	US 1988-171700		19880322		

AB The title composites consist of a matrix metal contg. a dispersed metal which does not form a solid soln. with the matrix metal at ordinary temps.; the dispersed metal has a particle size of 0.01-1 .mu.m and is present in an amt. of 0.5-20 wt.% of the composite. If the matrix is Ag, the dispersed metal is Ni, Cr, Fe, Co, Si, Rh, or V; if the matrix is Au, the dispersed metal is Ge, Si, Sb, or Rh; and if the matrix is **Cu**, the dispersed metal is Fe. Ag and Ni were placed in a graphite crucible in a wt. ratio of 95:5, melted, and sprayed through a ruby nozzle into a H2O film at 4.degree. on the inside of a rotating drum to form a composite powder of particle size 100-200 .mu.m. The nickel particle size in the Ag matrix was 0.5 .mu.m and the composite had **Vickers hardness** of 55, vs. 28 for a similar composite in which the Ni particle size was 1-20 .mu.m.

L28 ANSWER 10 OF 21 HCAPLUS COPYRIGHT 2002 ACS
AN 1988:497401 HCAPLUS
DN 109:97401
TI Composite bearing material for steel parts
IN Kubo, Masahiro; Donomoto, Tadashi; Tanaka, Atsuo
PA Toyota Motor Corp., Japan
SO Jpn. Kokai Tokkyo Koho, 11 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 63103034	A2	19880507	JP 1986-246796	19861017

AB The composite bearing material of high Mohrs hardness (Ms) is coupled with a steel part of **Vickers hardness** (10 kg) Hv .gtoreq.180 for low wear in sliding. The bearing material has a matrix of Al, Mg, **Cu**, Zn, Sn, and/or their alloy strengthened with 1-40 vol.% of fibers (Ms .gtoreq. 6, diam. .ltoreq. 20 .mu.m) and 3-50 vol.% short fibers and/or particles (Ms .ltoreq. 4.5, diam. .ltoreq. 100 .mu.m) of an oxide and/or nitride solid lubricant. Thus, cryst. Al2O3-52% SiO2 fibers (Ms = 7, av. diam. 2.8 .mu.m, av. length 3 mm), BN particles (Ms = 2, av. diam. 8 .mu.m), and colloidal SiO2 were mixed and then compacted

into a preform, which was infiltrated with AC8A Al alloy at 720.degree. and 1200 kg/mm2 to obtain a bearing block contg. 10 vol.% each of the reinforcing fibers and BN. The block after heat treatment (T 6) was made to slide at 0.3 mm/s and 20 kg/cm2 load on a cylindrical specimen of SUJ2 Cr steel (Hv = 850) under lubrication for 1 h. The wear depth of the block was 10 .mu.m, vs. 25 .mu.m in the absence of the solid lubricant.

L28 ANSWER 11 OF 21 HCAPLUS COPYRIGHT 2002 ACS
AN 1988:497400 HCAPLUS
DN 109:97400
TI Composite bearing material for nitrided steel parts
IN Kubo, Masahiro; Donomoto, Tadashi; Tanaka, Atsuo
PA Toyota Motor Corp., Japan
SO Jpn. Kokai Tokkyo Koho, 11 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 63103035	A2	19880507	JP 1986-246797	19861017

AB The composite bearing material of high Mohrs hardness (Ms) is coupled with a nitrided steel part of **Vickers hardness** (50 g) Hv .gtoreq. 550 for low wear in sliding. The bearing material has a matrix of Al, Mg, **Cu**, Zn, Sn, and/or their alloy strengthened with 1-45 vol.% fibers (Ms .gtoreq. 7, diam. .ltoreq.20 .mu.m) and 5-50 vol.% short fibers and/or particles (Ms .ltoreq. 4.5, diam. .ltoreq.100 .mu.m) of an oxide and/or nitride solid lubricant. Thus, cryst. Al2O3-52 wt.% SiO2 fibers (Ms = 7, av. diam. 2.8 .mu.m, av. length 3 mm), BN particles (Ms = 2, av. diam. 8 .mu.m), and colloidal SiO2 were mixed and then compacted into a preform, which was infiltrated with AC8A Al alloy at 720.degree. and 1200 kg/mm2 to obtain a bearing block contg. 10 vol.% each of the reinforcing fibers and BN. The block after heat treatment (T 6) was made to slide at 0.3 m/s on a cylindrical specimen of nitrided SUJ2 steel (Hv = 1000) under 20 kg/cm2 load and lubrication for 1 h. The wear depth of the block was .apprx.7.5 .mu.m, vs. 35 .mu.m in the absence of the solid lubricant.

L28 ANSWER 12 OF 21 HCAPLUS COPYRIGHT 2002 ACS
AN 1988:497399 HCAPLUS
DN 109:97399
TI Composite bearing material for cast iron part
IN Kubo, Masahiro; Donomoto, Tadashi; Tanaka, Atsuo
PA Toyota Motor Corp., Japan
SO Jpn. Kokai Tokkyo Koho, 12 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 63103036	A2	19880507	JP 1986-246798	19861017

AB The composite bearing material of high Mohrs hardness (Ms) is coupled with a cast iron part for low wear in sliding. The bearing material has a matrix of Al, Mg, **Cu**, Zn, Sn, and/or their alloy strengthened with 3-40 vol.% fibers (Ms .gtoreq. 6, diam. .ltoreq.30 .mu.m) and 3-50 vol.% short fibers and/or particles (Ms .ltoreq. 4.5, diam. .ltoreq.100 .mu.m) of an oxide and/or nitride solid lubricant. Thus, Si3N4 particles (Ms = 9, av. 10 .mu.m), BN particles (Ms = 2, av. 8 .mu.m), and colloidal

SiO2 were mixed and the compacted into a preform, which was infiltrated with AC8A Al alloy at 720.degree. and 1200 kg/mm2 to obtain a bearing block contg. 10 vol.% each of Si3N4 and BN. The block after heat treatment (T 7) was made to slide at 0.3 m/s on a cylindrical part of spheroidal graphite cast iron (FCD 70; **Vickers hardness** 250) under 20 kg/mm2 load and lubrication for 1 h. The wear of the block was .apprx.6 .mu.m and that of the cylinder was .apprx.0.3 mg, compared with .apprx.9 .mu.m and 1.0 mg when the BN was absent.

L28 ANSWER 13 OF 21 HCAPLUS COPYRIGHT 2002 ACS
AN 1988:497398 HCAPLUS
DN 109:97398
TI Composite bearing material for steel parts
IN Kubo, Masahiro; Donomoto, Tadashi; Tanaka, Atsuo
PA Toyota Motor Corp., Japan
SO Jpn. Kokai Tokkyo Koho, 12 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 63103037	A2	19880507	JP 1986-246799	19861017

AB The composite bearing material of high Mohrs hardness (Ms) is coupled with a steel part of **Vickers hardness** (10 kg) Hv .gtoreq. 180 for low wear in sliding. The bearing material has a matrix of Al, Mg, **Cu**, Zn, Sn, and/or their alloy strengthened with 3-40 vol.% hard particles (Ms .gtoreq. 6, diam. .ltoreq.30 .mu.m) and 3-50 vol.% short fibers and/or particles (Ms .ltoreq. 4.5, diam. .ltoreq.100 .mu.m) of an oxide and/or nitride solid lubricant. Thus, powd. Si3N4 (Ms = 9, av. 10 .mu.m), powd. BN (Ms = 2, av. 8 .mu.m), and colloidal SiO2 were mixed and then compacted into a preform, which was infiltrated with AC8A Al alloy at 720.degree. and 1200 kg/mm2 to obtain a bearing block contg. 10 vol.% each of Si3N4 and BN. The block after heat treatment (T 7) was made to slide at 0.3 mm/s on a cylindrical part of SUJ2 steel (Hv = 850) under 20 kg/mm2 load and lubrication for 1 h. The wear of the block was .apprx.7 .mu.m and that of the cylinder was 0.2 mg, compared with .apprx.10 .mu.m and 0.6 mg when powd. BN was absent.

L28 ANSWER 14 OF 21 HCAPLUS COPYRIGHT 2002 ACS
AN 1988:497397 HCAPLUS
DN 109:97397
TI Composite bearing material for nitrided steel parts
IN Kubo, Masahiro; Donomoto, Tadashi; Tanaka, Atsuo
PA Toyota Motor Corp., Japan
SO Jpn. Kokai Tokkyo Koho, 12 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 63103038	A2	19880507	JP 1986-246800	19861017

AB The composite bearing material of high Mohrs hardness (Ms) is coupled with a nitrided steel part of **Vickers hardness** (50 g) Hv .gtoreq.550 for low wear in sliding. The bearing material has a matrix of Al, Mg, **Cu**, Zn, Sn, and/or their alloy strengthened with 3-45 vol.% hard particles (Ms .gtoreq. 7, diam. .ltoreq.30 .mu.m) and 5-50 vol.% short fibers and/or particles of an oxide and/or nitride solid

lubricant (Ms .ltoreq. 4.5, diam. .ltoreq. 100 .mu.m). Thus, powd. Si3N4 (Ms = 9, av. 10 .mu.m), powd. BN (Ms = 2, av. 8 .mu.m), and colloidal SiO2 were mixed and then compacted into a preform, which was infiltrated with AC8A Al alloy at 720.degree. and 1200 kg/mm2 to obtain a bearing block contg. 10 vol.% each of SiN4 and BN. The block after heat treatment (T 7) was made to slide at 0.3 mm/s on a cylindrical part of nitrided SUJ2 steel (Hv = 1000) under 20 kg/mm2 load and lubrication for 1 h. The wear of the block was .apprx.5.5 .mu.m and that of the cylinder was 0.3 mg, compared with .apprx.10 .mu.m and 0.5 mg when the counter steel part had Hv = 450.

L28 ANSWER 15 OF 21 HCAPLUS COPYRIGHT 2002 ACS
AN 1988:99570 HCAPLUS
DN 108:99570
TI Sintered **composite materials** of **copper** and titanium diboride
IN Imagawa, Makoto; Hamashima, Kazuo
PA Asahi Glass Co., Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 4 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 62243726	A2	19871024	JP 1986-84943	19860415

AB The sintered composite **Cu** alloy contg. uniformly dispersed TiB2 particles (.ltoreq.1 .mu.) at 0.5-18% is used as elec. contacts, electrodes, or lead frames of high elec. cond. and hardness. Thus, a powder mixt. of **Cu** 97.4, Ti 1.8, and amorphous B 0.8 part in acetone was ball-milled, vacuum-dried, pressed at 2 ton/cm2, heated 1 h in vacuum at 1000.degree., and then rolled for 30% draft. A **Cu** -2.6% TiB2 alloy was obtained that showed sp. elec. resistance 1.99 .mu..OMEGA.-cm and **Vickers hardness** 150 or 110 kg/mm2 after 1 h heating at 1000.degree..

L28 ANSWER 16 OF 21 HCAPLUS COPYRIGHT 2002 ACS
AN 1988:42484 HCAPLUS
DN 108:42484
TI Light metallic composite and its manufacture
IN Inabata, Tadao
PA Inabata Techno Loop Corp., Japan
SO Eur. Pat. Appl., 11 pp.
CODEN: EPXXDW
DT Patent
LA English
FAN.CNT 3

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 235903	A1	19870909	EP 1987-300575	19870122
	R: AT, BE, CH, DE, ES, FR, GB, GR, IT, LI, LU, NL, SE				
	JP 62243724	A2	19871024	JP 1986-84891	19860415
	JP 62243732	A2	19871024	JP 1986-84893	19860415
PRAI	JP 1986-8930		19860122		
	JP 1986-84891		19860415		
	JP 1986-84893		19860415		

AB The composite comprises a matrix of Al, Mg, Zn, **Cu**, or their alloys and 10-70 vol. % fine granular additive of heat-resistant glasses, sintered metals, or ceramics such as SiO2, Al2O3, and ZrO2. The additive has a smaller d. than the matrix and can be provided in the form of hollow

spheres or metal-coated particles. The electromagnetic characteristics of the metal coating are different from those of the matrix. **Composite materials** were produced from Al matrix powders and Al-, **Cu**-, or Zn-coated Si-35% Al alloy microspheres of resp. av. particle sizes of 75, 100, and 75 .mu.. The resp. av. **Vickers hardness** nos. for prepd. composites were 23.2468, 20.6713, and 24.0066; their resp. av. densities were 1.7958, 1.6961, and 1.8711 g/cm3, while Al has a d. of 2.6989 g/cm3. The resp. calcd. amts. of microspheres in the composites were 46.4, 51.5, and 42.5 vol. %.

L28 ANSWER 17 OF 21 HCAPLUS COPYRIGHT 2002 ACS
AN 1986:617374 HCAPLUS
DN 105:217374
TI Conductive **composite materials**
IN Sawada, Kazuo
PA Sumitomo Electric Industries, Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 4 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 61099205	A2	19860517	JP 1984-220944	19841019
	JP 05023001	B4	19930331		

AB The materials which exhibit excellent softening resistance, high temp. strength, and abrasion resistance, and which are useful as electrode tips, are composed of inner layers of **Cu**-based alloys contg. 0.1-10% Ca and/or Al and 0.1-10% grains or short fibers of Al2O3, SiC, Si3N4, and/or C, and outer layers of **Cu** or its alloys. Thus, a **Cu**-Ca-Al-Zr alloy was melted, mixed with granular Al2O3 (diam. 1 .mu.) at 1100.degree. and cast into a **Cu** alloy billet contg. Ca 0.2, Al 0.3, Zr 0.1, and Al2O3 4.9%, which was hot extruded at 850.degree. to give a 12-mm inner material. The inner material was combined with a 1-mm thick **Cu** alloy pipe contg. 0.4% Be and 1.5% Co, diffusion annealed, and stretched to give an 8-mm **composite material** showing a **Vickers hardness** of 143 at room temp. and 142 at 600.degree., a cond. of 70.3% of the Intl. Annealed **Cu** Std., and abrasion loss (1 h, 10-kg load) 50.3 mg, vs. 137, 73, 82.3%, and 108.3 mg, resp., for a **Cu** alloy contg. 0.9% Cr and having no outer layer.

L28 ANSWER 18 OF 21 HCAPLUS COPYRIGHT 2002 ACS
AN 1986:483793 HCAPLUS
DN 105:83793
TI **Composite material** reinforced with alumina-silica fibers including mullite crystalline form
IN Dohnomoto, Tadashi; Kubo, Masahiro; Kito, Haruo
PA Toyota Motor Co., Ltd. , Japan; Isolite Babcock Refractories Co., Ltd.
SO U.S., 23 pp.
CODEN: USXXAM
DT Patent
LA English
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 4590132	A	19860520	US 1985-726358	19850423
	AU 8541719	A1	19860501	AU 1985-41719	19850426
	AU 573336	B2	19880602		

CA 1239297	A1	19880719	CA 1985-480560	19850502
EP 182959	A1	19860604	EP 1985-105698	19850509
EP 182959	B1	19880810		
R: DE, FR, GB, IT, SE				
IN 164532	A	19890401	IN 1985-CA359	19850509

PRAI JP 1984-225011 19841025

AB The composites have .gtoreq.0.5 vol.% reinforcing Al2O3-SiO2 fibers in a matrix of Al, Mg, **Cu**, Zn, Pb, Sn, or their alloys. The fibers contain SiO2 .apprx.35-65, Al2O3 .apprx.35-65, and CaO, MgO, Na2O, Fe2O3, Cr2O3, ZrO2, TiO2, PbO, SnO2, ZnO, MoO3, NiO, K2O, MnO2, B2O3, V2O5, CuO, and/or Co3O4) <10%, with mullite phase >15 and nonfibrous particles with diam. .gtoreq.150.mu. <5%. Thus, composites manufd. from AC8A Al alloy reinforced with Al2O3-SiO2 fibers showed low wear, **Vickers hardness** .gtoreq.1000, and bending strength 45 at room temp. and 35 kg/mm2 at 250.degree.. Composites from Al-4.5 **Cu**-0.4% Mg alloy whose preforms had 46 or 58 vol.% fibers had tensile strength 58 or 66 kg/mm2, vs. 33 kg/mm2 for the alloy.

L28 ANSWER 19 OF 21 HCAPLUS COPYRIGHT 2002 ACS
AN 1981:519510 HCAPLUS
DN 95:119510
TI Vibration-damping materials
PA Sumitomo Special Metals Co., Ltd., Japan
SO Jpn. Tokkyo Koho, 2 pp.
CODEN: JAXXAD
DT Patent
LA Japanese
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 56003177	B4	19810123	JP 1973-64247	19730605

AB Mn-**Cu** alloys having a vibration-damping coeff., Q-1, .gtoreq.0.005, and Fe-C, Fe-Ni, Fe-Ni-Cr, Co-Ni-Cr, **Cu**-Be, or Ni-Be high-strength alloys are used to make vibration-damping **composite materials** having high mech. strength and wear resistance. Thus, 2 Mn-**Cu** alloy [78890-13-8] plates contg. Mn 5.5, Al 4.5, Fe 3.5, Ni 1.5%, and balance **Cu**, and a Ni-1.5%Be alloy [78890-12-7] plate were heated to 875.degree. and rolled to obtain a composite sheet having Q-1 0.018, tensile strength 101 kg/mm2, elongation 33%, and **Vickers hardness** 550.

L28 ANSWER 20 OF 21 HCAPLUS COPYRIGHT 2002 ACS
AN 1981:178996 HCAPLUS
DN 94:178996
TI Composite part
IN Wahl, Hans; Wahl, Wolfgang
PA Verschleiss-Technik Dr. Ing. Hans Wahl G.m.b.H. und Co., Fed. Rep. Ger.
SO Ger. Offen., 10 pp.
CODEN: GWXXBX
DT Patent
LA German
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	DE 2922737	A1	19801211	DE 1979-2922737	19790605
	DE 2922737	C2	19820805		

AB A **composite material** with a wear- and heat-resistant cladding is used for hot-sinter screening machines, hot-sinter feeders, hot-clinker chutes and coolers, coke-oven chutes, hot-dust fans, etc. The

cladding is an Fe alloy (**Vickers hardness** >400) contg. C 1-6, Cr 12-40, Mn 0.5-8, Si 0.5-5, and Nb, Mo, **Cu**, Ni, V, and Al .ltoreq.10% each, and the substrate is a steel (**Vickers hardness** <300) contg. C 0.03-0.5, Cr 1-35, Ni 7-60, Mn 0.5-2, Si 0.4-3, Al .ltoreq.2, and Mo .ltoreq.10%. Thus, a substrate of stainless steel 1.4825 [66899-34-1] (C 0.15-0.35, Si 1.5-2.5, Mn 0.5-1.5, Cr 17-19, and Ni 8-10%) was surfaced with an Fe alloy [77396-20-4] contg. C 4.8, Cr 33, Mn 2, and Ni 2% and used in a hot-sinter screening machine. The service life of the clad part was 4 mo vs. 2-3 for the substrate stainless steel.

L28 ANSWER 21 OF 21 HCAPLUS COPYRIGHT 2002 ACS
AN 1978:534265 HCAPLUS
DN 89:134265
TI Composite element exposed to wear.
PA Verschleiss-Technik Dr. Ing. Hans Wahl G.m.b.H. und Co., Fed. Rep. Ger.
SO Fr. Demande, 27 pp.
CODEN: FRXXBL
DT Patent
LA French
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	FR 2345263	A1	19771021	FR 1977-8654	19770323
	DE 2612210	B1	19770922	DE 1976-2612210	19760323
	DE 2612210	C2	19780511		
	DE 2704605	B1	19780119	DE 1977-2704605	19770204
	NL 7703051	A	19770927	NL 1977-3051	19770321
	BE 852790	A1	19770718	BE 1977-176042	19770323
PRAI	DE 1976-2612210		19760323		
	DE 1977-2704605		19770204		

AB A procedure is given for the fabrication of a **composite material** which is exposed to heavy and hard wear. The composite is composed of a base material into which is anchored a protective layer of a hard durable material, such as carbides of W and Cr, ceramics, or mixts. of materials. The protective layer may be anchored in a no. of grooves cut out or cast in the base material. The no. and dimensions of the grooves are detd. such that they comprise 20-27% of the upper face of the base material. A no. of schemes are given on how to fill the grooves and holes with the hard protective material. These holes and/or grooves are filled with a hard material contg. 2-5% by wt. C, 15-50% Cr, 0-30% W, 0-30% Ni, 0-30% Nb, 0-30% **Cu**, 0-30% Mn [67676-85-1] which contains Fe and the usual impurities. The hard protective material should have a **Vickers hardness** 3 to 5 times the hardness of the base material.

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L32  ANSWER 1 OF 2  HCAPLUS  COPYRIGHT 2002 ACS
AN   1998:568707  HCAPLUS
DN   129:152295
TI   Composite material for heat sinks for semiconductor
     devices and its manufacture
IN   Ishikawa, Shuhei; Mitsui, Tsutomu
PA   NGK Insulators, Ltd., Japan
SO   Eur. Pat. Appl., 35 pp.
     CODEN: EPXXDW
DT   Patent
LA   English
FAN.CNT 1
     PATENT NO.        KIND  DATE          APPLICATION NO.   DATE
     ---------------   ----  --------      ---------------   --------
PI   EP 859410          A2   19980819      EP 1998-301078    19980213
     EP 859410          A3   19991215
         R:  AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,
             IE, SI, LT, LV, FI, RO
     JP 11029379        A2   19990202      JP 1997-359101    19971226
PRAI JP 1997-30698           19970214
     JP 1997-127540          19970516
     JP 1997-359101          19971226
AB   The composite material comprises impregnating a porous
     compact, obtained by presintering greenware, with Cu or Cu alloy, to
     obtain a composite material whose coeff. of
     thermal expansion at 200.degree. is lower than the
     coeff. of thermal expansion stoichiometrically
     obtained from the ration of the Cu or Cu alloy and the porous sintered
     compact.  The porous compact, e.g., SiC, may be preplated with Ni.  The
     porous compact is evacuated, and impregnated under pressure with the Cu or
     Cu alloy.

L32  ANSWER 2 OF 2  HCAPLUS  COPYRIGHT 2002 ACS
AN   1993:429089  HCAPLUS
DN   119:29089
TI   NTC effect in conductor/polymer composite
AU   Ota, Toshitaka; Yamai, Iwao
CS   Ceram. Res. Lab., Nagoya Inst. Technol., Tajimi, 507, Japan
SO   Seramikkusu Kenkyu Shisetsu Nenpo (Nagoya Kogyo Daigaku) (1992), 2, 51-3
     CODEN: SKSDEX
DT   Journal
LA   English
AB   A neg. temp. coeff. (NTC) of resistance was found in a conductor/polymer
     composite.  The composite material was composed of
     randomly dispersed conducting Ni-plated polystyrene
     resin particles and epoxy resin matrix.  The composites contg. 50 to 60
     vol% Ni-plated polystyrene exhibited significant NTC
     effects of about 2 orders of magnitude in the temp. range of 50.degree. to
     150.degree..  This NTC effect resulted from larger thermal
     expansion of conducting filler as compared with matrix.
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L34 ANSWER 1 OF 3 WPIX (C) 2002 THOMSON DERWENT
AN 1999-273634 [23] WPIX
DNN N1999-205192
TI Metal matrix **composite material** component for heat sink for electronic components in semiconductor device - includes processed body having predetermined **thermal expansion** coefficient and **Vickers hardness**.
DC P53 U11 V04
PA (NPDE) NIPPONDENSO CO LTD; (TOYW) TOYOTA CHUO KENKYUSHO KK
CYC 1
PI JP 11087581 A 19990330 (199923)* 5p
ADT JP 11087581 A JP 1997-252714 19970901
PRAI JP 1997-252714 19970901
AB JP 11087581 A UPAB: 19990616
NOVELTY - The component (1) consists of **composite material** (10) containing particulate material (3) in metal matrix (2). A processed body (5) arranged by the surface of **composite material**, has a **thermal expansion** coefficient of plus or minus 60% and **Vickers hardness** (Hv) of 150 or less. DETAILED DESCRIPTION - An INDEPENDENT CLAIM is included for manufacture of **composite material**.

USE - For heat sink for electronic components in semiconductor device.

ADVANTAGE - Workability of component is increased by suppressing peeling of material. DESCRIPTION OF DRAWING(S) - The drawing depicts structure of metal matrix **composite material**. (1) Component; (2) Metal matrix; (3) Particulate material; (5) Processed body; (10) **Composite material**.
Dwg.1/5

L34 ANSWER 2 OF 3 JAPIO COPYRIGHT 2002 JPO
AN 2001-035948 JAPIO
TI HIGH FREQUENCY SEMICONDUCTOR ELEMENT
IN SAITO RYUICHI; KONDO YASUO; AONO YASUHISA
PA HITACHI LTD
PI JP 2001035948 A 20010209 Heisei
AI JP1999-208670 (JP11208670 Heisei) 19990723
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2001
AB PROBLEM TO BE SOLVED: To enhance heat dissipation performance, matching of the coefficient of **thermal expansion** with a semiconductor chip, easiness of machining and light weight performance by composing a base substrate of **composite material** having a specified coefficient of **thermal expansion**, **thermal** conductivity of specified level or above, and **Vickers hardness** of a specified level or below.
SOLUTION: A base substrate 102 is composed of **composite materials** of Cu and Cu20 having a coefficient of **thermal expansion** of 15×10-6/°C, and thermal conductivity of 130 W/mk. A brazing material 113, e.g. solder, is applied onto the base substrate 102 and the electrode on the surface of a high frequency semiconductor chip 101 is connected with a terminal 104 through a wire 103. The terminal 104 is sealed of an insulating material 105, e.g. ceramics or glass, using brazing materials 110, 111. Furthermore, a frame 106 is jointed to a sealing material 107 through a brazing material 112 and then the sealing material 107 is welded to a cover 108 thus completing the high frequency semiconductor chip.
COPYRIGHT: (C)2001,JPO

L34 ANSWER 3 OF 3 JAPIO COPYRIGHT 2002 JPO
AN 1999-087581 JAPIO
TI METAL BASE **COMPOSITE MATERIAL** COMPONENT AND MANUFACTURE THEREOF
IN HOJO HIROSHI; NISHINO NAOHISA; TOWATA SHINICHI; KAMIYA NOBUO
PA TOYOTA CENTRAL RES & DEV LAB INC, JP (CO 000360)
DENSO CORP, JP (CO 000426)
PI JP 11087581 A 19990330 Heisei
AI JP1997-252714 (JP09252714 Heisei) 19970901
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 99, No. 3
AB PURPOSE: TO BE SOLVED:To improve processing characteristics without failures such as stripping by disposing a processing member having a specific **thermal expansion** coefficient and hardness on a surface of a metal base **composite material**.
CONSTITUTION: metal base **composite material** component 1 comprises a metal base **composite material** 10 including dispersed particles 3 in metal matrix 2 and a processing member 5 disposed on a surface of the metal base **composite material** 10. The processing member 5 is cast-placed on the surface of the material 10 by the metal matrix 2. The processing member 5 has a **thermal expansion** coefficient of .+-.60% of a **thermal expansion** coefficient of the metal base **composite material** 10 while its **Vickers hardness** Hv is 150 or less. Thus the processing member exhibits **thermal expansion** characteristics approximately equivalent to those of a metal **composite material** including a dispersion material, thereby preventing warpage or stripping. In addition, in figuring or drilling, it can be done within a range of thickness of the processing material without having dispersing particles of high hardness as an object for processing.

L35 ANSWER 1 OF 6 WPIX (C) 2002 THOMSON DERWENT
AN 2002-245970 [30] WPIX
DNN N2002-190750 DNC C2002-073832
TI **Composite material** for heat sink of semiconductor devices, has **copper** and **copper oxide** which has preset percentage of aspect ratio, area ratio of cross-section and is oriented in one direction.
DC L03 U11 U12 U14 X15
PA (HITA) HITACHI LTD
CYC 1
PI JP 2001189408 A 20010710 (200230)* 12p
ADT JP 2001189408 A JP 1999-372683 19991228
PRAI JP 1999-372683 19991228
AB JP2001189408 A UPAB: 20020513
NOVELTY - The **composite material** has **copper** and **copper oxide**. The aspect-ratio of the **copper oxide** is 50% or more, the area ratio of the cross-section is 3 or more and it is oriented in one direction.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

(a) Heat sink for semiconductor devices;

(b) Semiconductor device

USE - For heat sink used for semiconductor devices such as insulated gate bipolar transistor (IGBT) used in electric power conversion system.

ADVANTAGE - As the **composite material** has high heat conductivity and low **heat expansion** property, it gives a remarkable effect when used for heat sink.

DESCRIPTION OF DRAWING(S) - The figure shows top view of insulated gate bipolar transistor.

Dwg.5/18

L35 ANSWER 2 OF 6 WPIX (C) 2002 THOMSON DERWENT
AN 2001-568228 [64] WPIX
DNN N2001-423334 DNC C2001-168893
TI **Composite material** for semiconductor devices, contains **copper** or **copper** alloy in which **copper oxide** is dispersed, and is coated with **copper** or **copper** alloy.
DC L03 M26 U11
PA (HITA) HITACHI LTD
CYC 1
PI JP 2001181756 A 20010703 (200164)* 8p
ADT JP 2001181756 A JP 1999-372682 19991228
PRAI JP 1999-372682 19991228
AB JP2001181756 A UPAB: 20011105
NOVELTY - A **composite material** contains **copper** or **copper** alloy in which **copper oxide** is dispersed. The material is coated with **copper** or **copper** alloy.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for manufacture of **composite material**. A material comprising **copper** or **copper** alloy in which **copper oxide** is dispersed, is coated by **copper** or **copper** alloy and subjected to plastic working under cold- or hot-conditions. Alternatively, casting of molten metal containing **copper** or **copper** alloy and **copper oxide** is carried out in a container comprising **copper** or **copper** alloy, followed by solidification.

USE - The **composite material** is used for cooling plates, heat-release substrates and conductive components of semiconductor devices, and lead frames (all claimed).

ADVANTAGE - The **composite material** comprises the **copper** phase which has improved heat and electric conductivity, cold space workability, excellent bending property, and punching property and the **copper-copper oxide** (**Cu-CuO**) compound phase having low **heat-expansion** coefficient. Control of heat conductivity is enabled precisely during working.

DESCRIPTION OF DRAWING(S) - The figure shows sectional and top views of electric member made of **composite material**.
(Drawing includes non-English language text).
Electric current supply member 54
Copper oxide phase 61
Copper phase 62
Dwg.3/4

L35 ANSWER 3 OF 6 WPIX (C) 2002 THOMSON DERWENT
AN 2001-552788 [62] WPIX
DNN N2001-410848 DNC C2001-164933
TI **Composite material** for semiconductor devices, comprises inorganic compound and metal, and has particles having specific grain size occupying specific area.
DC L03 U11
PA (HITA) HITACHI LTD
CYC 1
PI JP 2001196513 A 20010719 (200162)* 17p
ADT JP 2001196513 A JP 2000-9969 20000113
PRAI JP 2000-9969 20000113
AB JP2001196513 A UPAB: 20011026
NOVELTY - A **composite material** contains an inorganic compound and a metal. The composite is formed of particles of which 5 or less particles having grain size of 100 mu m or more occupies 1 mm2. The major portion of remaining particles have grain size of 50 mu m or less.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following: (i) Manufacture of **composite material** which involves sintering or casting; (ii) Cooling plate for semiconductor devices; (iii) Semiconductor device which is mounted on an insulated substrate; and (iv) Electrostatic dielectric board for adsorbers.

USE - For cooling plates used in semiconductor devices and for electrostatic dielectric board for adsorbers (all claimed).

ADVANTAGE - The **composite material** is novel, and has excellent plastic working property, **thermal expansion** coefficient, **heat** conductivity and low **heat expansion** property.
Dwg.0/20

L35 ANSWER 4 OF 6 WPIX (C) 2002 THOMSON DERWENT
AN 2001-400700 [43] WPIX
DNN N2001-295502 DNC C2001-121850
TI **Composite material** for resin-sealed package of power semiconductor device, has **copper** and **copper-oxide** particle which has **thermal expansion** coefficient less than **copper**.
DC L03 U11
PA (HITA) HITACHI LTD
CYC 1
PI JP 2000311973 A 20001107 (200143)* 7p

ADT JP 2000311973 A JP 1999-121284 19990428
PRAI JP 1999-121284 19990428
AB JP2000311973 A UPAB: 20010801
NOVELTY - The **composite material** contains **copper** alloy which includes **copper** and 5-20 vol% of **copper-oxide** particle having **thermal expansion** coefficient smaller than **copper**. The **copper-oxide** particle is dispersed such that cross sectional area ratio with respect to the **copper** is set to preset value.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for the semiconductor device.

USE - For resin-sealed package of power semiconductor device.

ADVANTAGE - As the **composite material** has high thermal conductance due to low **thermal expansion** exhibited by **copper-oxide** particle, effective heat dissipation is achieved. Since the **composite material** has high plastic working property, manufacturing process is shortened.
Dwg.0/5

L35 ANSWER 5 OF 6 WPIX (C) 2002 THOMSON DERWENT
AN 2000-442165 [38] WPIX
DNN N2000-329975 DNC C2000-134370
TI **Composite material** used as heat sink for semiconductor device comprises metal and inorganic compound particles.
DC L03 M26 U11 V04
IN ABE, T; AONO, Y; ARAKAWA, H; INGAKI, M; KANEDA, J; KOIKE, Y; KONDO, Y; SAITO, R
PA (HITA) HITACHI LTD; (ABET-I) ABE T; (AONO-I) AONO Y; (ARAK-I) ARAKAWA H; (INGA-I) INGAKI M; (KANE-I) KANEDA J; (KOIK-I) KOIKE Y; (KOND-I) KONDO Y; (SAIT-I) SAITO R
CYC 23
PI WO 2000034539 A1 20000615 (200038)* JA 53p
RW: AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE
W: CN JP KR RU US
CN 1275170 A 20001129 (200121)
KR 2001052078 A 20010625 (200172)
EP 1167559 A1 20020102 (200209) EN
R: DE FR GB IT NL SE
JP 2000586971 X 20020326 (200223)
ADT WO 2000034539 A1 WO 1998-JP5527 19981207; CN 1275170 A CN 1998-809356 19981207, WO 1998-JP5527 19981207; KR 2001052078 A WO 1998-JP5527 19981207, KR 2000-703086 20000323; EP 1167559 A1 EP 1998-957211 19981207, WO 1998-JP5527 19981207; JP 2000586971 X WO 1998-JP5527 19981207, JP 2000-586971 19981207
FDT EP 1167559 A1 Based on WO 200034539; JP 2000586971 X Based on WO 200034539
PRAI WO 1998-JP5527 19981207
AB WO 200034539 A UPAB: 20000811
NOVELTY - The **composite material** comprises a metal and particles of an inorganic compound having coefficient of **thermal expansion** lower than that of the metal. The particles are in dispersed lump form having complex configuration and at least 95% of the particles are interconnected to one another.

DETAILED DESCRIPTION - The **composite material** contains 20-80 volume % **copper oxide**, the balance being **copper**, has a coefficient of **thermal expansion** of 5 x 10-6 to 14 x 10-6/ deg. C in the temperature range of room temperature to 300 deg. C and thermal conductivity 30-325 W/m.K.

USE - Heat sinks for semiconductor devices, and dielectric plates for electrostatic adsorbers.

ADVANTAGE - **Composite material** has high thermal conductivity, low coefficient of **thermal expansion**, and high plastic workability.

Dwg.0/21

L35 ANSWER 6 OF 6 JAPIO COPYRIGHT 2002 JPO
AN 2001-189408 JAPIO
TI **COMPOSITE MATERIAL**, HEAT-SINK PLATE FOR SEMICONDUCTOR DEVICE USING THE SAME, AND SEMICONDUCTOR ELEMENT
IN OKAMOTO KAZUTAKA; KONDO YASUO; WATABE NORIYUKI; SUZUKI KIYOMITSU; ABE TERUYOSHI; AONO YASUHISA; KANEDA JUNYA
PA HITACHI LTD
PI JP 2001189408 A 20010710 Heisei
AI JP1999-372683 (JP11372683 Heisei) 19991228
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2001
AB PROBLEM TO BE SOLVED: To provide a **copper composite material** of low **thermal expansion** coefficient and high heat conductivity, a heat-sink board for a semiconductor device using it, and the semiconductor device.

SOLUTION: **Copper** and **copper oxide** are contained, while the aspect ratio for the most part of **copper oxide** is 5-20. It is preferred that between room temperature and 300°C, the linear expansion coefficient be 5×10-6-17×10-6/°C, the thermal conductivity be 100-380 W/m.K, the thermal conductivity in its orientation be higher than that in the direction perpendicular to the orientation, with the difference being 5-120 W/m.K, and the linear expansion coefficient in the orientation direction between the room temperature and 300°C be higher than that in the perpendicular direction in the orientation direction.

L37 ANSWER 1 OF 5 WPIX (C) 2002 THOMSON DERWENT
AN 1991-099643 [14] WPIX
DNN N1991-076908 DNC C1991-042895
TI Nickel-molybdenum composite sheet prodn. - by laminating nickel sheet(s) and molybdenum sheet and hot rolling for semiconductor base boards.
DC L03 M21 P55 P73
PA (TOLT) TOKYO TUNGSTEN KK
CYC 1
PI JP 03045338 A 19910226 (199114)*
ADT JP 03045338 A JP 1989-179011 19890713
PRAI JP 1989-179011 19890713
AB JP 03045338 A UPAB: 19930928

Composite material comprises laminated Ni and Mo and is prepd. by laminating Ni sheet(s) and Mo sheet and hot rolling the laminated sheets.

USE/ADVANTAGE - It is used as a base board for semiconductor elements. Its **thermal expansion** coefft. can be controlled to a value similar to that of semiconductors by changing the thicknesses of Ni and Mo sheets to prevent breaking, cracking and insufficient bonding of semiconductors during bonding of semiconductor to the base board.

In an example, a Mo plate (1.0 x 100 x 150mm) was sandwiched between 2 **Ni plates** (1.0 x 110 x 170mm), heated at 750-1000 deg.C in H2 gas and hot rolled to a draw ratio of 10-50%. The welded sheet was reheated and hot rolled to a draw ratio of 5-30% and the hot rolling repeated to a final size of 1.0 x 100 x 4000mm and heated at 900 deg.C in H2 gas to reduce the oxide on the surfaces of the composite sheet.
0/2

L37 ANSWER 2 OF 5 JAPIO COPYRIGHT 2002 JPO
AN 2000-311972 JAPIO
TI SEMICONDUCTOR DEVICE
IN KANEDA JUNYA; KONDO YASUO; OKAMOTO KAZUTAKA; ABE TERUYOSHI; AONO YASUHISA
PA HITACHI LTD
PI JP 2000311972 A 20001107 Heisei
AI JP1999-121281 (JP11121281 Heisei) 19990428
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2000
AB PROBLEM TO BE SOLVED: To reduce module size by employing an insulating substrate of inorganic oxide principally comprising Al2O3 and a heat dissipating substrate composed of a **composite material** of metal and particles of inorganic compound having coefficient of **thermal expansion** smaller than that of the metal.

SOLUTION: A plurality of alumina Al2O3 substrate 103 mounting semiconductor elements are connected, through solder 205, to a heat dissipating substrate 109 composed of a Cu-Cu2O **composite material** subjected to **Ni plating** over the entire surface thereof. Between respective insulating substrates 103, the alumina substrate 103 is wired through solder 209 with the terminal 206 of a case block 208 where the terminal 206 is integrated with a resinous case 207. Since the alumina plate has coefficient of **thermal expansion** larger than that of an AlN plate, difference of **thermal expansion** can be reduced as compared with the base material and thereby warp of a module itself can be reduced. Since allowable size of the substrate can be increased using the alumina plate, the number of semiconductor elements to be mounted on one substrate can be increased.

L37 ANSWER 3 OF 5 JAPIO COPYRIGHT 2002 JPO
AN 1985-140751 JAPIO
TI BONDING PIECE FOR THICK-FILM HYBRID INTEGRATED CIRCUIT
IN SUGIURA SHIGEMICHI; TONAMI TSUNECHIKA; MIYAMOTO KENJI
PA SUMITOMO SPECIAL METALS CO LTD, JP (CO 330335)
PI JP 60140751 A 19850725 Showa
AI JP1983-251632 (JP58251632 Showa) 19831227
SO PATENT ABSTRACTS OF JAPAN, Unexamined Applications, Section: E, Sect. No. 362, Vol. 9, No. 3, P. 82 (19851129)
AB PURPOSE: To remove peeling and cracking in a cold-heat cycle by constituting a bonding piece by three-layer **composite materials** of a metallic material having a **thermal expansion** coefficient approximately the same as ceramics and an Al layer and a metallic layer having excellent solder wetting properties applied on both the surface and the back when semiconductor chips and the bonding pieces are each fitted on separate wiring conductor formed on the surface of an alumina ceramic circuit substrate through solder layers.
CONSTITUTION: Separate wiring conductor 2 is formed on an alumina ceramic circuit substrate 1 containing 96% Al2O3, a semiconductor chip 5 and a bonding piece 7 are each fixed onto the wiring conductors 2 by using solder layers 8, and these chip and bonding piece are connected mutually by an Al wiring 6. In the constitution, an Fe-42% Ni alloy in approximately 310.mu.m thickness is used as a core material 13 for the bonding piece 7, and an Al clad layer 14 in apporoximately 20.mu.m thickness is applied on one surface of the core material and an **Ni plated** layer 15 in approximately 2.mu.m thickness on the other surface. Accordingly, the breaking load of the bonding piece 7 is increased while peeling from the core material 13 is also removed.

L37 ANSWER 4 OF 5 JAPIO COPYRIGHT 2002 JPO
AN 1983-040847 JAPIO
TI LEAD FRAME
IN YASUDA TOMIRO; SHIMIZU SADAICHI; KAMATA MITSUNARI; KADOSE MASUO; KUNIYA KEIICHI
PA HITACHI LTD, JP (CO 000510)
PI JP 58040847 A 19830309 Showa
AI JP1981-138470 (JP56138470 Showa) 19810904
SO PATENT ABSTRACTS OF JAPAN, Unexamined Applications, Section: E, Sect. No. 178, Vol. 7, No. 1231, P. 37 (19830527)
AB PURPOSE: To well radiate the heat of a chip and restrain the generation of thermal strains, by constituting a semicoductor chip mount part of a Cu-C fiber **composite material** and a lead part of a Cu or a Cu alloy.
CONSTITUTION: A lead frame substrate 1 is constituted of a Cu-C containing only 50vol% of carbon fiber, and a chip 3 connection part is **Ni plated** 6. The chip 3 is connected to the substrate 1, **Ni plated** 6, by a solder of 95wt% Pb and 5wt% Sn. The electrode of the chip 3 and the top end of a pure copper lead 2 are connected by an Al wire 4. Then, the chip 3 is covered with a gel insulator 7 and resin sealed 8. In this constitution, the heat of the chip is rapidly conducted and radiated by the Cu-C, and thermal strains becomes micro, since the coefficient of **thermal expansion** is approximate to that of an Si chip. Accordingly, the chip is contrived for larger size and high performance.

L37 ANSWER 5 OF 5 JAPIO COPYRIGHT 2002 JPO
AN 1982-120358 JAPIO
TI SEMICONDUCTOR DEVICE
IN ONUKI HITOSHI; TAMAMURA TATEO; FUNIYU MASAO; KUNIYA KEIICHI

PA HITACHI LTD, JP (CO 000510)
PI JP 57120358 A 19820727 Showa
AI JP1981-5019 (JP56005019 Showa) 19810119
SO PATENT ABSTRACTS OF JAPAN, Unexamined Applications, Section: E, Sect. No. 138, Vol. 6, No. 2151, P. 160 (19821028)
AB PURPOSE: To obtain a high conductivity of heat and an excellent heat fatigue resisting characteristic by a method wherein Cu-C **composite material** is used for a radiator and an insulation plate is bonded to the radiator plate by use of Al solder. CONSTITUTION: A Cu-C **composite material** wherein Copper having a high conductivity of heat is arranged in a matrix and a carbon fiber having a remarkably low **heat expansion** coefficient has been buried therein, is used for a radiator plate 11. subsequently, the Cu-C **composite material** is used also for wiring films 16a, 16b. And an **Ni plating** layers 13a-13c are provided in the radiator plate 11 and the wiring films 16a, 16b, and they are bonded through Al solder 12a, 12b to an alumina plate 15. Thereafter, a semiconductor element 18 is bonded to the wiring film 16b by a soldering and a lead wire 19 is connected to the element 18. As described above, since the Cu-C composite plate is directly bonded to Al2O3 plate 15 not to be metallized by using Al solder, the Al2O3 plate 15 can be formed thin remarkably. As a result, a thermal resistance can be reduced remarkably.

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L42  ANSWER 1 OF 7  WPIX (C) 2002 THOMSON DERWENT
AN   2000-053003 [04]   WPIX
DNN  N2000-041325        DNC C2000-013726
TI   Material for printed circuit board.
DC   A85 L03 V04 X12
IN   ISHIKAWA, S; KAWAI, S; OTAGIRI, T; SUZUKI, T
PA   (NIGA) NGK INSULATORS LTD
CYC  23
PI   WO 9957948     A1 19991111 (200004)* JA   28p
        RW: AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE
         W: AU CA CN US
     AU 9935382     A  19991123 (200016)
     JP 2000031607 A  20000128 (200017)        9p
     JP 2000101215 A  20000407 (200028)        6p
     EP 1028607     A1 20000816 (200040)  EN
         R: DE FR GB
     CN 1273762     A  20001115 (200115)
     US 6379781     B1 20020430 (200235)
ADT  WO 9957948 A1 WO 1999-JP2257 19990427; AU 9935382 A AU 1999-35382
     19990427; JP 2000031607 A JP 1998-206111 19980722; JP 2000101215 A JP
     1999-123387 19990430; EP 1028607 A1 EP 1999-917198 19990427, WO
     1999-JP2257 19990427; CN 1273762 A CN 1999-801096 19990427; US 6379781 B1
     WO 1999-JP2257 19990427, US 1999-446768 19991223
FDT  AU 9935382 A Based on WO 9957948; EP 1028607 A1 Based on WO 9957948; US
     6379781 B1 Based on WO 9957948
PRAI JP 1998-206111    19980722; JP 1998-123289    19980506; JP 1998-206110
     19980722
AB   WO    9957948 A UPAB: 20000124
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NOVELTY - Material includes electroconductive metal wiring disposed at preset pitch on plate-shaped **composite material** comprising plastic and ceramic. One side and the other side of the board material are made electrically conductive by the metal wire.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for

(A) an intermediate block for printed circuit boards where the ceramic content of the **composite material** is 40-90 % volume, metal wiring is linearly disposed from the one surface of the intermediate block to the other surface which opposes the one surface and the metal wiring protrudes on the one surface and the other surface; and

(B) the manufacture of the printed circuit board by stretching a metal wire at a preset pitch in a metal mold, pouring a **composite material** of plastics and ceramics into this metal mold, hardening the **composite material** and slicing so that the stretched metal wire is horizontally cut.

USE - Used as material for printed circuit boards.

ADVANTAGE - The board material can ensure a good electric conduction and prevents separation of the board material from a **conductive layer** and the separation of an insulating material from a metal wire so as to provide a higher density and higher dimensional accuracy printed circuit board.

DESCRIPTION OF DRAWING(S) - The figure shows one example of the printed circuit board according to present invention.

printed circuit board material 10

composite material 11

metal wiring 12

Dwg.1/8

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L42  ANSWER 2 OF 7  JAPIO  COPYRIGHT 2002 JPO
AN   1997-312364    JAPIO
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TI **COMPOSITE MATERIAL** FOR ELECTRONIC COMPONENT AND ITS MANUFACTURE
IN NAKANISHI HIROKI; KAWAUCHI YUJI; KAWAKAMI AKIRA
PA HITACHI METALS LTD, JP (CO 000508)
PI JP 09312364 A 19971202 Heisei
AI JP1996-150362 (JP08150362 Heisei) 19960522
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 97, No. 12
AB PURPOSE: TO BE SOLVED:To secure high heat conductivity in a stacking direction and to provide low thermal expansibility.
CONSTITUTION: he **composite material**, the high heat **conductive layers** 3 of **copper** or **copper** alloy and the low **thermal expansion** layers 1 of Fe-Ni system alloy are alternately stacked desirably for more than 10 layers. Plural through holes 2 are formed in the low **thermal expansion** layers 1 in a thickness direction, **copper** or **copper** alloy is filled in the through holes 2 and a diffused layer having the thickness of not less than 5% of that of the low **thermal expansion** layer 1 is formed on the stacking interface of the low **thermal expansion** layer 1. Then, it is used for a heat sink or a heat spreader. In the **composite material**, the thin sheets of **copper** or **copper** alloy and the thin sheets of Fe-Ni system alloy, in which the plural through holes are formed, are alternately stacked, pressure is reduced lower than 10-3Torr, pressurization is executed not less than 50MPa, at 700-1050.degree.C, a junction processing is executed and the material is made into a prescribed board thickness by rolling.

L42 ANSWER 3 OF 7 JAPIO COPYRIGHT 2002 JPO
AN 1997-312361 JAPIO
TI **COMPOSITE MATERIAL** FOR ELECTRONIC COMPONENT AND ITS MANUFACTURE
IN NAKANISHI HIROKI; KAWAUCHI YUJI; KAWAKAMI AKIRA
PA HITACHI METALS LTD, JP (CO 000508)
PI JP 09312361 A 19971202 Heisei
AI JP1996-126680 (JP08126680 Heisei) 19960522
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 97, No. 12
AB PURPOSE: TO BE SOLVED:To secure high heat conductivity in a stacking direction and to provide low thermal expansibility.
CONSTITUTION: high heat **conductive layers** 3 of **copper** or **copper** alloy and the low **thermal expansion** layers 1 of Fe-Ni system alloy are alternately stacked and they form the multilayered structure of more than 10 layers, desirably more than 50 layers. The high heat **conductive layers** 3 sandwiching the low **thermal expansion** layers 1 are made into a **composite material** for electronic component, which is used for a heat sink or a heat spreader that continues through a plurality of through holes 2 formed on the low **thermal expansion** layers 1. In the **composite material** for electronic parts, the thin sheets of **copper** or **copper** alloy and the thin sheets of Fe-Ni system alloy, where the plurality of through holes 2 are formed, are alternately stacked, pressure is reduced lower than 10-3Torr, pressurization is executed not less than 50MPa in the temperature range of 700-1050.degree.C, and a junction processing is executed. Then, it is made a prescribed board thickness by rolling.

L42 ANSWER 4 OF 7 JAPIO COPYRIGHT 2002 JPO

AN 1992-061293 JAPIO
TI CIRCUIT BOARD AND MANUFACTURE THEREOF
IN UENO FUMIO; KASORI MITSUO; ITSUDO YOSHIKO; HORIGUCHI AKIHIRO
PA TOSHIBA CORP, JP (CO 000307)
PI JP 04061293 A 19920227 Heisei
AI JP1990-169918 (JP02169918 Heisei) 19900629
SO PATENT ABSTRACTS OF JAPAN, Unexamined Applications, Section: E, Sect. No. 1216, Vol. 16, No. 263, P. 137 (19920615)
AB PURPOSE: To provide a sufficient thickness and to prevent peeling from an insulating base material due to the influence of a thermal stress by providing a conductor **layer** containing **conductive** metal as a main ingredient on an insulating board and dispersing fine particles made of a material having lower **thermal expansion** coefficient than that of the metal of specific vol%.
CONSTITUTION: An insulating board 1 provided with a conductor **layer** 7 containing **conductive** metal as a main ingredient thereon and dispersing fine particles made of a material having lower **thermal expansion** coefficient than that of the metal of 0.5-20vol% is made of inorganic or inorganic and metal **composite material** using sintered ceramics, a single crystal or glass and a **composite material** of glass and other component. The metal includes, for example, **copper**, silver, gold, etc. A circuit board is manufactured by forming a conductor layer 7 of paste 5 containing bubbles instead of the fine particles. In such a method, a conductor layer in which pores of 0.5-20vol% is dispersed is formed.

L42 ANSWER 5 OF 7 JAPIO COPYRIGHT 2002 JPO
AN 1992-015985 JAPIO
TI BASE BOARD FOR HYBRID IC
IN SHIBAYAMA NAOKI; KURODA YOSHIKATSU
PA MITSUBISHI HEAVY IND LTD, JP (CO 000620)
PI JP 04015985 A 19920121 Heisei
AI JP1990-117632 (JP02117632 Heisei) 19900509
SO PATENT ABSTRACTS OF JAPAN, Unexamined Applications, Section: E, Sect. No. 1194, Vol. 16, No. 17, P. 74 (19920423)
AB PURPOSE: To make it excellent in the environment resistance in high temperature region and make it have high heat radiation and high specific strength by forming the base material of a metallic group **composite material**, using a specific matrix material and low thermoexpansive fiber material whose **thermal expansion** coefficient is approximate to that of a bare chip, or the like.
CONSTITUTION: An Al2O3 insulating layer is deposited by vacuum on the base material of a metallic group **composite material** MMC composed of one or more kinds of matrix materials selected from Al, Ti, **Cu**, Ag, Au, Ni, Pt, Ta, Mo, and W and a low thermoexpansive fiber material such as Si, C, or the like. Next, Al is deposited by vacuum as the **conductive layer** at the first layer, and then by etching a circuit is formed. Furthermore, thereon an Al2O3 insulating layer is deposited by vacuum, and a via hole is opened by etching. Thereon, as the **conductive layer** at the second layer, Al is deposited by vacuum, and it is connected to the circuit at the first layer through the via hole, and also by etching the circuit at the second layer is formed. Repeating these works, circuits are made in a multilayer, and an MMC base board is manufactured.

L42 ANSWER 6 OF 7 JAPIO COPYRIGHT 2002 JPO
AN 1986-194197 JAPIO
TI ROLLER AND ITS PRODUCTION

IN OKAYA KAN; KASHIYAMA SETSUO; SUZUKI KINUKO
PA MITSUBISHI RAYON CO LTD, JP (CO 000603)
PI JP 61194197 A 19860828 Showa
AI JP1985-35592 (JP60035592 Showa) 19850225
SO PATENT ABSTRACTS OF JAPAN, Unexamined Applications, Section: C, Sect. No. 398, Vol. 11, No. 18, P. 121 (19870117)
AB PURPOSE: To produce a high-performance roller having uniform quality, high hardness and wear resistance by **coating** successively a **conductive** treating material **layer**, **copper** layer and hard chrome layer on the surface of a cylindrical material consisting of a **composite material** contg. carbon fiber tows.
CONSTITUTION: The resin-impregnated carbon fiber tows are wound about perpendicularly on a cylindrical shaft to form the innermost layer 1. Said tows are alternately wound at 5-45.degree. with the shaft to form an intermediate layer 2 and are wound about perpendicularly to the shaft to form the outermost layer 3, successively by which the cylindrical material is obtd. The material rigidity of the resulted cylindrical material in the axial direction of the cylinder is .gtoreq.6.5t/mm2 and the coefft. of **thermal expansion** at -30-130.degree.C does not exceed 2.times.10-5/.degree.C in the axial direction of the cylinder and 6.times.10-5/.degree.C in the perpendicular direction thereof. The **conductive film** 4 is formed on the surface A of such cylindrical material and the nickel or **copper** layer 5 is coated and formed as underlying plating thereon. The chrome plating layer 6 which is hard and highly resistant to wear is thereafter coated and formed as the final layer thereon. Such cylindrical material is finished by polishing, by which the lightweight and highly rigid roller is obtd.

L42 ANSWER 7 OF 7 JAPIO COPYRIGHT 2002 JPO
AN 1985-100441 JAPIO
TI SEMICONDUCTOR DEVICE
IN HARADA SHIGERU
PA MITSUBISHI ELECTRIC CORP, JP (CO 000601)
PI JP 60100441 A 19850604 Showa
AI JP1983-207720 (JP58207720 Showa) 19831105
SO PATENT ABSTRACTS OF JAPAN, Unexamined Applications, Section: E, Sect. No. 348, Vol. 9, No. 2511, P. 42 (19851008)
AB PURPOSE: To improve the thermal stress withstanding capability of a semiconductor device composed of a flip chip and thereby to widen the scope of service of the semiconductor device by a method wherein a semiconductor chip formed into an element and a bonding substrate are electrically connected with each other with the intermediary of a unidirectionally **conductive film** made of **composite material**.
CONSTITUTION: A semiconductor chip 1 and a ceramic substrate 3 are bonded together by heating or thermocompression with the intermediary of a unidirectionally **conductive film** 7 composed of **composite material**. The composite film 7 is fabricated, for example, by densly imbedding metal lines 8 of **Cu**, Au or Ag in insulating resin 9 in the direction of its thickness. The composite **film** 7 is **conductive** in the direction of thickness only (electrically anisotropic), is mechanically rigid in the direction of thickness and soft in the lateral direction. Thermal stress that may be present along the region of bond between the semiconductor chip 1 and the ceramic substrate 3 attributable to different **thermal expansion** factors is absorbed or reduced.

L44 ANSWER 1 OF 59 WPIX (C) 2002 THOMSON DERWENT
AN 2002-303842 [34] WPIX
DNC C2002-088312
TI Blank for manufacture of dental model such as crowns, bridges, is fabricated from partially sintered ceramic material which is sintered to preset value.
DC A96 D21 P32
IN PANZERA, C
PA (PANZ-I) PANZERA C; (PENR) JENERIC/PENTRON INC
CYC 95
PI WO 2002007680 A2 20020131 (200234)* EN 14p
RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ NL OA PT SD SE SL SZ TR TZ UG ZW
W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK DM DZ EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW
US 2002017021 A1 20020214 (200234)
AU 2001083494 A 20020205 (200236)
ADT WO 2002007680 A2 WO 2001-US41379 20010716; US 2002017021 A1 Provisional US 2000-219893P 20000721, US 2001-905806 20010713; AU 2001083494 A AU 2001-83494 20010716
FDT AU 2001083494 A Based on WO 200207680
PRAI US 2000-219893P 20000721; US 2001-905806 20010713
AB WO 200207680 A UPAB: 20020528
NOVELTY - A blank for manufacture of dental model is fabricated from a partially sintered ceramic material sintered to less than 92% of theoretical full density.
DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for:
(i) a method for making a dental restoration, which involves milling a dental model from a partially sintered ceramic material which is sintered to less than 92% (theoretical full density), applying dental material and curing the dental material on the model to obtain a dental restoration;
(ii) a method of making a blank for manufacture of dental model, which involves shaping a mixture comprising refractory material and a binder, and partially sintering the formed shape so as to sinter the ceramic material to 92% (theoretical full density).
USE - For fabrication of models, such as crowns, bridges, space maintainers, tooth replacement appliances, orthodontic retainers, dentures, posts, jackets, inlays, onlays, facings, veneers, facets, implants, abutments, splints, partial crowns, teeth, cylinders, pins and/or connectors used for dental restoration.
ADVANTAGE - The mold has **thermal expansion** lower than the **thermal expansion** of the materials applied (ceramic, **metal**, alloy, composite), depending upon materials used. The materials used to fabricate the mold is stable and has fire resistance, hence the dimension of mold is not changed during subsequent firing steps. The method enables manufacture of dental restoration by providing millable, soft blanks of material that can be easily machined into model or dies.
Dwg.0/0

L44 ANSWER 2 OF 59 WPIX (C) 2002 THOMSON DERWENT
AN 2002-257567 [30] WPIX
DNN N2002-199388 DNC C2002-076684
TI Wear resistant composite product manufacture, useful for grinding tools,

involves fusing mixture of materials by heating to a temperature above the liquidus temperature of one of the materials present in the mixture.
DC L02 M22 P53
IN HUGGETT, P G
PA (HUGG-I) HUGGETT P G
CYC 96
PI WO 2002013996 A1 20020221 (200230)* EN 26p
RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ NL OA PT SD SE SL SZ TR TZ UG ZW
W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG US UZ VN YU ZA ZW
ADT WO 2002013996 A1 WO 2001-AU974 20010809
PRAI AU 2000-9334 20000810
AB WO 200213996 A UPAB: 20020513
NOVELTY - Material (M1) and material (M2) are heated below standard atmospheric pressure to a temperature (T2) above liquidus temperature of material (M1), and maintained for preset time at temperature (T2). Material (M1) is at least partially fused with material (M2) to produce wear resistant composite product (10). The material (M1) has liquidus temperature lower than the solidus temperature of material (M2).

DETAILED DESCRIPTION - The material (M2) is in the form of an insert and material (M1) is contained in a non-consumable mold.

An INDEPENDENT CLAIM is also included for a wear resistant composite product.

USE - Used for grinding tools and industrial processing plants.

ADVANTAGE - The limited orientation of wear products, limitation in thickness of weld **metal** deposit, close machining tolerance required for vacuum brazing, limitations of vacuum brazed component size, limitation of end product size due to difference in **thermal expansion** of wear material and substrate, limitation of shape complexity and cracking of wear resistant material during manufacture can be minimized by the wear resistant composite manufacture.

DESCRIPTION OF DRAWING(S) - The figure illustrates the **composite material** production.

Composite product 10

Dwg.2/8

L44 ANSWER 3 OF 59 WPIX (C) 2002 THOMSON DERWENT
AN 2002-228942 [29] WPIX
DNN N2002-175918 DNC C2002-069740
TI Laminated radiation mechanism used in power semiconductor apparatus includes radiation plate and substrate, which are bonded with **metal** base **composite material** layer in which ceramic particles are dispersed.
DC L03 P42 U11
IN ARAKI, K; BESSYO, Y; ISHIKAWA, T; KIDA, M; MAKINO, T
PA (NIGA) NGK INSULATORS LTD
CYC 28
PI EP 1122780 A2 20010808 (200229)* EN 19p
R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI TR
JP 2001291808 A 20011019 (200229) 12p
US 2001031345 A1 20011018 (200229)
ADT EP 1122780 A2 EP 2001-300797 20010130; JP 2001291808 A JP 2001-18637 20010126; US 2001031345 A1 US 2001-774206 20010130
PRAI JP 2000-23422 20000131
AB EP 1122780 A UPAB: 20020508

NOVELTY - A laminated radiation mechanism comprises a radiation plate, an insulation substrate, and an electrode. The radiation plate and the substrate are bonded with a **metal** base **composite material** layer in which ceramic particles are dispersed.

DETAILED DESCRIPTION - A laminated radiation mechanism comprises a radiation plate, an insulation substrate bonded to the upper surface of the plate, and an electrode provided on the upper surface of the substrate. The radiation plate and the substrate are bonded with a **metal** base **composite material** layer in which ceramic particles are dispersed, and which are present between the radiation plate and the insulation substrate.

INDEPENDENT CLAIMS are also included for the following:

(A) a power semiconductor apparatus comprising a circuit electrode, a laminated radiation member, a semiconductor chip bonded to the circuit electrode, and a **metal** wire which is electrically connected to the circuit electrode;

(B) a method for making a laminated radiation mechanism, comprising previously treating a bonding surface to the radiation plate and the insulation substrate, interposing previously treated ceramic particles with a hard solder or a **metal** between the reaction plate and the insulation substrate, disposing a hard solder above and/or below the ceramic particles, heating the hard solder to a temperature higher than the melting point of the solder to melt the solder, penetrating the molten hard solder between the ceramic particles to produce a **metal** base **composite material**, and bonding the radiation plate and the insulation substrate with the **metal** base **composite material** present between the radiation plate and the insulation substrate; and

(C) a method for making a power semiconductor apparatus, comprising: bonding a semiconductor chip to an electrode of the laminated radiation mechanism; electrically connecting **metal** wires to the semiconductor chip and the electrode; and placing the semiconductor chip, the laminated radiation mechanism, and the circuit electrode in a package.

USE - The laminated radiation mechanism is used in a power semiconductor apparatus.

ADVANTAGE - The laminated radiation mechanism is free from cracks generated due to the difference in **thermal expansion** coefficient between an insulation substrate and the radiation plate. It has excellent radiation properties and thermal cycle characteristics.
Dwg.0/4

L44 ANSWER 4 OF 59 WPIX (C) 2002 THOMSON DERWENT
AN 2002-181014 [24] WPIX
DNC C2002-056362
TI Heat-resistant structural body, for e.g. semiconductor-processing apparatus, comprises substrate comprising metallic aluminum and/or nitrided material comprising aluminum nitride phase and metallic aluminum phase.
DC L03 M13 P73
IN WATANABE, M
PA (NIGA) NGK INSULATORS LTD
CYC 28
PI EP 1176223 A1 20020130 (200224)* EN 15p
 R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI TR
 US 2002034633 A1 20020321 (200224)
 JP 2002038252 A 20020206 (200226) 11p
ADT EP 1176223 A1 EP 2001-306409 20010726; US 2002034633 A1 US 2001-911704 20010724; JP 2002038252 A JP 2000-226865 20000727

PRAI JP 2000-226865 20000727
AB EP 1176223 A UPAB: 20020416
NOVELTY - A heat-resistant structural body comprises a substrate comprising metallic aluminum and/or a nitrided material formed on the substrate. The nitrided material comprises mainly an aluminum nitride phase and a metallic aluminum phase.
USE - Semiconductor-processing apparatus or a liquid crystal panel-producing apparatus.
ADVANTAGE - The heat-resistant structural body has high heat resistance and heat-cycling durability.
Dwg.0/0

L44 ANSWER 5 OF 59 WPIX (C) 2002 THOMSON DERWENT
AN 2002-166148 [22] WPIX
DNN N2002-126878 DNC C2002-051420
TI Electrostatic chuck for holding substrate comprises electrostatic mechanism having dielectric covering electrode, which is chargeable, and base below the electrostatic mechanism, comprising composite of materials.
DC L02 L03 M22 P56 P62 U11
IN BEDI, S S; CHENG, W L; GRIMARD, D S; KATS, S L; KHOLODENKO, A; KUMAR, A H; NARENDRNATH, K R; SHAMOUILIAN, S; VEYTSER, A M; WANG, Y
PA (MATE-N) APPLIED MATERIALS INC; (BEDI-I) BEDI S S; (CHEN-I) CHENG W L; (GRIM-I) GRIMARD D S; (KATS-I) KATS S L; (KHOL-I) KHOLODENKO A; (KUMA-I) KUMAR A H; (NARE-I) NARENDRNATH K R; (SHAM-I) SHAMOUILIAN S; (VEYT-I) VEYTSER A M; (WANG-I) WANG Y
CYC 2
PI JP 2001102436 A 20010413 (200222)* 70p
US 6310755 B1 20011030 (200222)
US 2002036881 A1 20020328 (200225)
ADT JP 2001102436 A JP 2000-174436 20000508; US 6310755 B1 US 1999-307215 19990507; US 2002036881 A1 US 1999-306934 19990507
PRAI US 1999-307215 19990507; US 1999-306934 19990507; US 1999-306944 19990507; US 1999-307214 19990507
AB JP2001102436 A UPAB: 20020409
NOVELTY - An electrostatic chuck (55) comprises an electrostatic mechanism (100) having a dielectric (115) covering an electrode (105) which is chargeable to electrostatistically hold the substrate (30). A base (175) is below the electrostatic mechanism, comprising a composite of materials.
DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for (A) a method of fabricating the electrostatic chuck, comprising forming an electrostatic mechanism, and forming a base; (B) a method of processing a substrate in a chamber, comprising placing the substrate on an electrostatic mechanism in the chamber, heating the substrate by powering a heater below the electrostatic mechanism, providing a gas in a cavity in a support (190) below the electrostatic mechanism, and providing an energized process gas in the chamber to process the chamber.
USE - For use in a chamber for processing a substrate (claimed).
ADVANTAGE - The electrostatic chuck can be operated at high temperatures without excessive thermal or mechanical degradation. It can heat substrates to higher temperatures than those provided by the heat load of the plasma. It has a uniform and low thermal impedance to transfer heat to and from the substrate to allow rapidly heating or cooling of the substrate. It has a secure and reliable connection between its electrode and electrical connector.
DESCRIPTION OF DRAWING(S) - The figure shows a schematic sectional side view of the chamber.
Substrate 30
Electrostatic chuck 55
Electrostatic mechanism 100

Electrode 105
Dielectric 115
Base 175
Dwg.1/8

L44 ANSWER 6 OF 59 WPIX (C) 2002 THOMSON DERWENT
AN 2002-164255 [21] WPIX
DNN N2002-125409
TI Backing plate material, used as e.g. microelectronics packaging lid, comprises high modulus fiber **metal** matrix.
DC U11
IN LI, J; SCOTT, T; WHITE, T
PA (HONE) HONEYWELL INT INC
CYC 94
PI WO 2001092594 A2 20011206 (200221)* EN 18p
RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ NL OA PT SD SE SL SZ TR TZ UG ZW
W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK DM DZ EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW
AU 2001063507 A 20011211 (200225)
ADT WO 2001092594 A2 WO 2001-US40765 20010518; AU 2001063507 A AU 2001-63507 20010518
FDT AU 2001063507 A Based on WO 200192594
PRAI US 2001-765526 20010119; US 2000-208657P 20000531
AB WO 200192594 A UPAB: 20020403
NOVELTY - A backing plate material comprises a **metal** matrix and fibers dispersed within the **metal** matrix. The fibers have a higher modulus than the **metal** matrix.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for:

(A) formation of a high modulus fiber **metal** matrix **composite material** comprising subjecting a mixture of fiber and **metal** powder to hot pressing, vacuum hot pressing or squeeze casting to consolidate the mixture into the high modulus fiber **metal** matrix **composite material**;

(B) an assembly (50) comprising a ceramic material target (54) bonded to the backing plate (52); and

(C) forming a physical vapor deposition target assembly comprising forming backing plate from **metal** and fibers, and bonding the backing plate surface to a physical vapor deposition target to form the sputtering target assembly.

USE - Used as a backing plate with physical vapor deposition (PVD) targets e.g. high power tungsten, tantalum and ceramic PVD targets, and in construction of semiconductor substrates. It can also be used as microelectronics packaging lid, heat spreader and heat sink (claimed).

ADVANTAGE - The backing plate CTE can be adjusted to match the CTE of the target material. When the CTE of the backing plate and the CTE of the target material are matched, thermally induced stress can be eliminated from an interface between the two. The result can be a strong and reliable backing plate/target assembly which can withstand the demands of high powder sputtering. The backing plate has a good thermal conductivity for heat dissipation. The thermal conductivity is reduced through the horizontal thickness, but is unchanged in the vertical cross-sectional plane aligned with the fibers. This effectively causes the backing plate to act as a heat spreader, further reducing the possibility of thermal stress in the backing plate/target assembly. The backing plate also has good mechanical strength. Compared to copper, the matrix material is stiffer and more than 30% lighter which can be a significant improvement

for larger parts.
DESCRIPTION OF DRAWING(S) - The figure shows a cross-section of the target/backing plate construction.
Assembly 50
Backing plate 52
Target 54
Dwg.3/6

L44 ANSWER 7 OF 59 WPIX (C) 2002 THOMSON DERWENT
AN 2002-133807 [18] WPIX
DNN N2002-101214 DNC C2002-041193
TI Optical module or information recording/reproducing device has at least one solid film layer formed on at least one surface of substrate, and optical member with unevenness on all or part of thickness of solid film layer.
DC E12 P81 T03 V07 W04
PA (NIPG) NIPPON SHEET GLASS CO LTD
CYC 1
PI JP 2001201625 A 20010727 (200218)* 5p
ADT JP 2001201625 A JP 2000-7090 20000114
PRAI JP 2000-7090 20000114
AB JP2001201625 A UPAB: 20020319
NOVELTY - Optical module or information recording/reproducing device having at least one solid film layer formed on a substrate, and an optical member with unevenness on all or part of the thickness of the solid film layer. Where the property variation of the device is by environmental temperature, this is negated by the variation of optical characteristics due to **thermal expansion** of the substrate.
DETAILED DESCRIPTION - Optical module or information recording/reproducing device has at least one solid film layer formed on at least one surface of a substrate, and an optical member with unevenness on all or part of the thickness of the solid film layer. At least part of the property variation of the device is by variation of the environmental temperature, this is negated by the variation of optical characteristics due to **thermal expansion** of the substrate of the optical member.
USE - Used in manufacture of substrates for information recording media.
ADVANTAGE - The optical member has a high heat resistance fine roughness surface.
DESCRIPTION OF DRAWING(S) - Figure 1 shows an example of the optical member.
Substrate 1
Solid Film Layer 2
Rough Structure 3,4
Dwg.1/4

L44 ANSWER 8 OF 59 WPIX (C) 2002 THOMSON DERWENT
AN 2002-120937 [16] WPIX
DNN N2002-090690 DNC C2002-036891
TI Multichip electronic packaging structure comprises electronic substrate perforated with array of flexible electrical conductors, interconnection layer, and electrical device(s).
DC A85 L03 U11 V04
IN KEATING, J T; LU, D
PA (PERF-N) PERFORMANCE INTERCONNECT INC
CYC 1
PI US 6294731 B1 20010925 (200216)* 15p
ADT US 6294731 B1 Provisional US 1999-124657P 19990316, US 2000-526384

20000316
PRAI US 1999-124657P 19990316; US 2000-526384 20000316
AB US 6294731 B UPAB: 20020308
NOVELTY - A multichip electronic packaging structure comprises a planar electronic substrate having upper and lower surfaces. An array of flexible electrical conductors perforates the substrate. A planar interconnection layer is provided having upper and lower surfaces. Electrical device(s) is connected to the upper surface of the interconnection layer.

DETAILED DESCRIPTION - A multichip electronic packaging structure comprises a coefficient of **thermal expansion** (CTE) controlled electronic substrate having upper and lower surfaces. An array of flexible electrical conductors (190) perforates the substrate and extends from the substrate lower surface. A predetermined portion of the extending, flexible conductors is surrounded by a dielectric material to form a core (180). The distal ends of the flexible conductors furthest from the substrate lower surface are exposed. A shell (170) is in contact with the lower surface of the substrate and surrounds the perimeter of the core. A planar interconnection layer (150) is provided having upper and lower surfaces. The lower surface of the interconnect layer is electrically connected to the array of conductors and affixed to the upper surface of the substrate. Electrical device(s) (110) is connected to the upper surface of the interconnection layer. The exposed ends of the flexible conductors form a compliant, conductive, demountable interface adapted for connecting the electrical device to an external substrate.

USE - For use in multichip semiconductor packaging.

ADVANTAGE - The inventive packaging structure exhibits optimum inductance and capacitance, thus ensuring reliable electrical operation.

DESCRIPTION OF DRAWING(S) - The figure shows a cross-sectional view of the multichip electronic packaging structure.

Electrical device 110
Thermally conductive shim 120
Encapsulating material 130
Package cover 140
Interconnection layer 150
Shell 170
Core 180
Electrical conductors 190
Dwg.1/9

L44 ANSWER 9 OF 59 WPIX (C) 2002 THOMSON DERWENT
AN 2002-084648 [12] WPIX
DNN N2002-062951 DNC C2002-025910
TI High thermal conductivity **composite material** used as heatsink, has first constituent with composite carbon grains, carbon fibers, or carbide grains with surface coating layer, and second constituent with silver and/or copper.
DC L03 U11
IN KAWAI, C; NAKATA, H
PA (SUME) SUMITOMO ELECTRIC IND CO; (KAWA-I) KAWAI C; (NAKA-I) NAKATA H
CYC 28
PI EP 1168438 A2 20020102 (200212)* EN 26p
R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI TR
JP 2002080280 A 20020319 (200222) 20p
US 2002041959 A1 20020411 (200227)
ADT EP 1168438 A2 EP 2001-114757 20010622; JP 2002080280 A JP 2001-129070 20010426; US 2002041959 A1 US 2001-886617 20010622
PRAI JP 2001-129070 20010426; JP 2000-189943 20000623
AB EP 1168438 A UPAB: 20020221

NOVELTY - A high thermal conductivity **composite material** comprises: a first constituent comprising composite carbon grains, composite carbon fibers, or composite carbide grains, having a surface coating layer; and a second constituent comprising a **metal** including silver and/or copper. The coating layer comprises carbide of 4A, 5A or 6A group elements of the periodic table.

DETAILED DESCRIPTION - A high thermal conductivity **composite material** comprises:

(a) a first constituent comprising composite carbon grains, composite carbon fibers, or composite carbide grains, having a coating layer on its surface; and

(b) a second constituent comprising a **metal** including silver and/or copper. The coating layer comprises carbide of 4A, 5A or 6A group elements of the periodic table. The high thermal conductivity **composite material** has a relative density of at least 70%, a thermal conductivity of at least 220 W/m.K at 25 deg. C at least in a specified direction, and a mean coefficient of **thermal expansion** of 5 - 15 x 10-6/ deg. C from 25-200 deg. C at least in a specified direction.

An INDEPENDENT CLAIM is also included for a method for producing a high thermal conductivity **composite material** as above comprising:

(a) preparing a graphite powder, carbon fibers, or a carbide powder, and simultaneously preparing an alloy powder including a main constituent of silver and/or copper, and a type of **metal** comprising 4A, 5A or 6A group elements of the periodic table;

(b) molding a mixture of the powders into a molded body; and

(c) heating the molded body at a higher temperature than the melting point of the alloy in a vacuum state whose pressure is at most 0.0133 Pa, or in a gas atmosphere containing helium, argon or hydrogen, to produce a sintered body and simultaneously form a coating layer on the surface of the graphite grains, carbon fibers or carbide grains.

The coating layer comprises at least a type of **metal** comprising 4A, 5A or 6A group elements of the periodic table.

USE - The material is used as a heatsink (2) for semiconductor devices (claimed).

ADVANTAGE - The high thermal conductivity **composite material** is low in cost, has a high thermal conductivity and a small coefficient of **thermal expansion**.

DESCRIPTION OF DRAWING(S) - The figure shows a sectional view of a package using the heatsink comprising the **composite material**.

Package 1
Heatsink 2
Semiconductor element 3
Bonding wire 4
Lead frame 5
Dwg.2/2

L44 ANSWER 10 OF 59 WPIX (C) 2002 THOMSON DERWENT
AN 2002-063546 [09] WPIX
DNC C2002-018287
TI Production of intermetallic compound-based **composite material** involves mixing **metal** powder with reinforcing material, placing aluminum on upper side of mixed powder and impregnating mixed powder with aluminum melt.
DC L02 M13 M22 M26
IN KIDA, M
PA (NIGA) NGK INSULATORS LTD

CYC 28
PI EP 1160343 A2 20011205 (200209)* EN 21p
R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT
RO SE SI TR
JP 2002047519 A 20020215 (200215) 13p
US 2002051724 A1 20020502 (200234)
ADT EP 1160343 A2 EP 2001-304521 20010523; JP 2002047519 A JP 2001-149499
20010518; US 2002051724 A1 US 2001-863680 20010523
PRAI JP 2001-149499 20010518; JP 2000-154607 20000525
AB EP 1160343 A UPAB: 20020208

NOVELTY - An intermetallic compound-based **composite material** is produced by mixing a **metal** powder with a reinforcing material to obtain a mixed powder, which is filled into a vessel. Aluminum is then placed on an upper side of the mixed powder and the mixed powder is impregnated with an aluminum melt.

DETAILED DESCRIPTION - Production of an intermetallic compound-based **composite material** involves mixing a **metal** powder with a reinforcing material to obtain a mixed powder which is filled into a vessel. Aluminum (Al) is placed on an upper side of the mixed powder and the mixed powder is then impregnated with an Al melt giving rise to a spontaneous reaction between the **metal** powder and the Al melt to convert the Al melt into an aluminide intermetallic compound. After the spontaneous reaction, a mass ratio of the remaining Al to the intermetallic compound-based **composite material** is 0:10 to 3:7.

USE - Production of intermetallic compound-based **composite material** used for space and aviation fields.

ADVANTAGE - The process produces intermetallic compound-based **composite material** of large size or complicated shape in reduced steps and reduced costs without applying high pressure. The intermetallic compound-based **composite material** shows well balanced fracture toughness and mechanical strength, high thermal conductivity and abrasion resistance with lower coefficient of **thermal expansion**.

Dwg.0/1

L44 ANSWER 11 OF 59 WPIX (C) 2002 THOMSON DERWENT
AN 2002-049009 [06] WPIX
CR 1999-551017 [44]; 1999-551021 [44]; 1999-551022 [44]; 2000-350122 [27];
2000-364682 [27]; 2001-244130 [14]; 2001-257406 [14]; 2001-257524 [17];
2001-389548 [17]; 2002-017346 [62]; 2002-034088 [62]; 2002-034089 [62];
2002-041186 [62]; 2002-041187 [62]; 2002-041188 [62]; 2002-049008 [62]
DNN N2002-036304 DNC C2002-013639
TI Partially coated fabric for reinforcing composites, has fiber strand coated with coating composition comprising discrete particles formed from organic materials, lubricious material(s) and film-forming material(s).
DC A85 F01 G02 L03 U11 V04 X12
IN LAMMON-HILINSKI, K; LAWTON, E L; NOVICH, B E; RICE, W B; ROBERTSON, W J;
VELPARI, V; WU, X
PA (PITT) PPG IND OHIO INC
CYC 93
PI WO 2001068755 A1 20010920 (200206)* EN 164p
RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ
NL OA PT SD SE SL SZ TR TZ UG ZW
W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CR CU CZ DE DK DM
DZ EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC
LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD SE
SG SI SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW
AU 2001047564 A 20010924 (200208)

ADT WO 2001068755 A1 WO 2001-US8739 20010316; AU 2001047564 A AU 2001-47564 20010316
FDT AU 2001047564 A Based on WO 200168755
PRAI US 2000-706023 20001103; US 2000-527034 20000316; US 2000-548379 20000412; US 2000-568916 20000511; US 2000-620523 20000720; US 2000-620524 20000720; US 2000-620525 20000720; US 2000-620526 20000720
AB WO 200168755 A UPAB: 20020204
NOVELTY - Partially coated fabric comprises fiber strand(s) having fibers (12) coated with coating composition comprising discrete particles (18) formed from organic materials, **inorganic** polymeric materials and/or **composite materials**; lubricious material(s) different from particles (18); and film-forming material(s). Discrete particles have average particle size measured by laser scattering of 0.1-5 microns m.

USE - For reinforcing composites and air-jet weaving process. The coated fiber strands is used as warp and/or weft strands and in a knit or woven fabric reinforcement, preferably to form laminate for reinforcement for telecommunication cables, and various other composites, and electronic circuit board such as active electronic components, passive electronic components, printed circuits, integrated circuits, semiconductor devices and other hardware elements such as connectors, sockets, retaining clips and sinks, and for printed circuit board or printed wiring board. The composites and laminates of partially coated fabric used for forming packaging used in electronic industry, particularly first, second and/or third level packaging.

ADVANTAGE - The coated fiber strands have excellent processability in weaving and knitting, low fuzz and halos, low broken filaments, low strand tension, high fliability and low insertion time, and enlarged cross-sectional area. The coated fiber strands inhibits abrasion and breakage of fibers during processing, and exhibits excellent air-jet transport properties, wet-through, wet-out and dispersion properties.

The laminate formed from the coated fiber strand has excellent laminate strength, thermal stability, hydrolytic stability and low corrosion. The laminate formed from coated fiber strand is highly reactive in presence of high humidity, reactive acids, alkalies; is compatible with variety of polymeric matrix materials; and has low coefficient of **thermal expansion**, excellent flexural strength and interlaminar bond strength.

The removal of coating by heat or pressurized water prior to lamination is eliminated. The coating on the fiber strands facilitate thermal conduction along coated surfaces of fibers. The coated glass fiber promote heat dissipation from heat source along the reinforcement to conduct heat away from electronic components and thereby inhibit thermal degradation and/or deterioration of circuit components, glass fibers and polymeric matrix materials.

The coated glass fibers provide higher thermal conductivity phase than the matrix material, thereby reducing differential **thermal expansion** and warpage of electronic circuit board and improving solder joint reliability. The coated glass fiber strands lessen or eliminate the need for incorporating thermally conductive materials in the resin. Hence laminate manufacturing operations is improved, and cost of matrix material supply tank purging and maintenance are reduced. The production cycle time, fabric handling and labor cost are reduced, and the need for capital equipment is avoided. The quality of fabric is improved. The electronic supports and printed circuit boards formed from the fiber stand have excellent drillability and resistance to **metal** migration.

DESCRIPTION OF DRAWING(S) - The figure shows the perspective view of

coated fiber strand.
Fibers 12
Discrete particles 18
Glass fibers 23,25
Dwg.1/13

L44 ANSWER 12 OF 59 WPIX (C) 2002 THOMSON DERWENT
AN 2002-034088 [04] WPIX
CR 1999-551017 [44]; 1999-551021 [44]; 1999-551022 [44]; 2000-350122 [27]; 2000-364682 [27]; 2001-244130 [14]; 2001-257406 [14]; 2001-257524 [17]; 2001-389548 [17]; 2002-017346 [62]; 2002-034089 [62]; 2002-041186 [62]; 2002-041187 [62]; 2002-041188 [62]; 2002-049008 [62]; 2002-049009 [62]
DNN N2002-026279 DNC C2002-009455
TI Partially coated fiber strands used in air jet weaving, has fibers coated with composition comprising a lubricious material, a film-forming material and discrete particles such as (in)organic or **composite material**.
DC A85 F01 G02 L03 V04 X12
IN LAMMON-HILINSKI, K; LAWTON, E L; NOVICH, B E; RICE, W B; ROBERTSON, W J; VELPARI, V; WU, X
PA (PITT) PPG IND OHIO INC
CYC 93
PI WO 2001068748 A1 20010920 (200204)* EN 66p
RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ NL OA PT SD SE SL SZ TR TZ UG ZW
W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CR CU CZ DE DK DM DZ EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW
AU 2001052911 A 20010924 (200208)
ADT WO 2001068748 A1 WO 2001-US8471 20010316; AU 2001052911 A AU 2001-52911 20010316
FDT AU 2001052911 A Based on WO 200168748
PRAI US 2000-706268 20001103; US 2000-527034 20000316; US 2000-548379 20000412; US 2000-568916 20000511; US 2000-620523 20000720; US 2000-620524 20000720; US 2000-620525 20000720; US 2000-620526 20000720
AB WO 200168748 A UPAB: 20020128
NOVELTY - Partially coated fiber strand (10) comprises fibers (12) having coating composition (CC) on at least a portion (17) of fiber surface (16). CC contains discrete particles (DP) formed from organic materials, **inorganic** polymeric materials and/or **composite materials**, having average particle size of 0.1-5 mu m, at least one lubricious material different from DP and at least one film-forming material.

DETAILED DESCRIPTION - Partially coated fiber strand comprises fibers having coating composition on at least a portion of surface of at least one of the fibers.

The composition comprises:

(a) discrete particles formed from organic materials, **inorganic** polymeric materials, **composite materials** or their mixtures, having an average particle size of 0.1-5 mu m measured according to laser scattering techniques; (b) at least one lubricious material different from discrete particles; and

(c) at least one film-forming polymer.

An INDEPENDENT CLAIM is also included for fiber comprising a coating composition. The coating composition comprises:

(a) discrete particles formed from non-heat expandable organic materials, **inorganic** polymeric materials, lamellar particles

having thermal conductivity of at least 1 Watt/m deg. K at 300 deg. K or non-heat expandable **composite materials** or their mixture;

(b) at least one lubricious material different from discrete particles; and

(c) at least one film-former.

The discrete particles have an average particle size sufficient to allow strand wet out.

USE - The strands are used in air jet weaving process and for fabrics used in printed circuit board applications, electronic supports, electronic packaging applications.

ADVANTAGE - The coated fiber strands are well compatible with the matrix material in which the strands are incorporated. The coating on surface of fiber strands protects the fibers from abrasion during processing and provides good weavability, particularly on air-jet looms and provides good wet-through and wet-out properties to the strands. The coated fiber strands exhibit good laminate strength, good thermal stability, good hydrolytic stability, low corrosion and reactivity in the presence of high humidity, reactive acids and alkalis and compatibility with variety of polymeric matrix materials, which can eliminate the need for removing the coating and in particular heat of pressurized water cleaning, prior to lamination.

The coated strand has preferable characteristic such as low fuzz and halos, low broken filaments, low strand tension, high fliability and low insertion time. The strands facilitate weaving and knitting and provides fabrics with few surface defects. The unique coating on the glass fiber strands facilitate thermal conduction along coated surfaces of the fibers. The coated glass fibers promotes heat dissipation from heat source when used as continuous reinforcement for electronic circuit board and thereby conduct heat away from electronic components and inhibit thermal degradation and/or deterioration of circuit components, glass fibers and polymeric matrix material.

The coating reduces differential **thermal expansion** and warpage of electronic circuit board and improves solder joint reliability. The coated strands eliminates the need for incorporating thermally conductive materials in the matrix resin, which improves laminate manufacturing operations and lowers costly matrix material supply tank purging and maintenance. The composites and laminates formed from the fiber strand have low coefficient of **thermal expansion** , good flexible strength, good interlaminar bond strength and good hydrolytic stability. The electronic supports and printed circuit boards made from coated strand have good drillability and resistance to **metal** migration. The production cycle time, fabric handling and labor costs are reduced and fabric with good quality and properties is provided.

DESCRIPTION OF DRAWING(S) - The figure shows the perspective view of the coated fiber strand at least partially coated with the coating composition.

Coated fiber strand 10

Fibers 12

Surface of fiber 16

Portion of the surface 17

Dwg.1/13

L44 ANSWER 13 OF 59 WPIX (C) 2002 THOMSON DERWENT
AN 2002-029257 [04] WPIX
DNN N2002-022692 DNC C2002-008382
TI **Metal**-ceramic **composite material**, is obtained by permeating aluminum alloy having preset magnesium content into

preform obtained from silicon carbide powder.
DC L02 M13 P53
PA (ONOD) TAIHEIYO CEMENT CORP
CYC 1
PI JP 2001226177 A 20010821 (200204)* 5p
ADT JP 2001226177 A JP 2000-43502 20000216
PRAI JP 2000-43502 20000216
AB JP2001226177 A UPAB: 20020117
NOVELTY - **Metal**-ceramic **composite material**, is obtained by permeating aluminum alloy into preform obtained from silicon carbide powder. Aluminum alloy contains 2-12 weight% of magnesium. 95 volume% of more of preform void is filled with aluminum alloy.
DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for **metal**-ceramic composite manufacture which involves melting aluminum alloy containing 2-12 weight% of magnesium at 700-900 deg. C under pressure less nitrogen atmosphere, and permeating aluminum alloy into preform formed from silicon carbide powder.
USE - As **metal**-ceramic **composite material**
.
ADVANTAGE - The **metal**-ceramic **composite material** has uniform filling factor. The composite has high toughness, high thermal conductance, high rigidity and low **thermal expansion**.
Dwg.0/0

L44 ANSWER 14 OF 59 WPIX (C) 2002 THOMSON DERWENT
AN 2002-027536 [04] WPIX
DNC C2002-007914
TI Production of a silicon carbide preform mixing silicon carbide particles with an organic binder, an **inorganic** binder, a clustering agent and distilled water, pouring into a mold, drying and calcining.
DC A93 L02
IN HONG, S H; JEON, K Y; LEE, H S; JUN, G Y
PA (KOAD) KOREA ADV INST SCI & TECHNOLOGY
CYC 3
PI DE 10053832 A1 20011018 (200204)* 13p
JP 2001287989 A 20011016 (200204) 7p
KR 2001094499 A 20011101 (200223)
DE 10053832 C2 20020404 (200225)
ADT DE 10053832 A1 DE 2000-10053832 20001030; JP 2001287989 A JP 2000-333622 20001031; KR 2001094499 A KR 2000-16821 20000331; DE 10053832 C2 DE 2000-10053832 20001030
PRAI KR 2000-16821 20000331
AB DE 10053832 A UPAB: 20020117
NOVELTY - Production of a silicon carbide preform comprises mixing silicon carbide particles of different particle size in the region of 0.2-48 mu m with an organic binder, an **inorganic** binder, a clustering agent and distilled water and stirring the mixture produced by
(a) grinding in a ball mill to form a slurry containing silicon carbide particles;
(b) pouring the slurry into a pressing mold and squeezing off the slurry in the mold to reduce the residual moisture;
(c) completely drying the slurry to form the preform; and
(d) calcining the preform.
DETAILED DESCRIPTION - Preferred Features: Cationic starch is added in an amount of 0.1-5 wt.% as the organic binder. Colloidal silicic acid is added in an amount of 0.1-10 wt.% as the **inorganic** binder. The squeezing off step is carried out in the axial direction at a pressure of 0.5-3.00 MPa. Calcination is carried out at 800-1100 deg. C for 2-6

L44 ANSWER 15 OF 59 WPIX (C) 2002 THOMSON DERWENT
AN 2002-017346 [02] WPIX
CR 1999-551017 [44]; 1999-551021 [44]; 1999-551022 [44]; 2000-350122 [27]; 2000-364682 [27]; 2001-244130 [14]; 2001-257406 [14]; 2001-257524 [17]; 2001-389548 [17]; 2002-034088 [62]; 2002-034089 [62]; 2002-041186 [62]; 2002-041187 [62]; 2002-041188 [62]
DNN N2002-013912 DNC C2002-004890
TI Fabric for use in electronic packaging applications, comprises fiber strand(s) of several fibers coated with resin compatible composition, which has preset air jet compatibility.
DC A85 F01 G02 L03 V04 X12
IN LAMMON-HILINSKI, K; LAWTON, E L; NOVICH, B E; RICE, W B; ROBERTSON, W J; VELPARI, V; WU, X
PA (PITT) PPG IND OHIO INC
CYC 93
PI WO 2001068752 A1 20010920 (200202)* EN 161p
RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ NL OA PT SD SE SL SZ TR TZ UG ZW
W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CR CU CZ DE DK DM DZ EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW
AU 2001045851 A 20010924 (200208)
ADT WO 2001068752 A1 WO 2001-US8684 20010316; AU 2001045851 A AU 2001-45851 20010316
FDT AU 2001045851 A Based on WO 200168752
PRAI US 2000-705353 20001103; US 2000-527034 20000316; US 2000-548379 20000412; US 2000-568916 20000511; US 2000-620523 20000720; US 2000-620524 20000720; US 2000-620525 20000720; US 2000-620526 20000720
AB WO 200168752 A UPAB: 20020128

NOVELTY - A fabric comprises fiber strand(s) (10) comprising several fibers (12) provided with a resin compatible coating (14) on the surface (16). The strand has an Air Jet Transport Drag Force Value of 100000 gram force/gram mass or more, determined by a needle air jet nozzle unit having an internal air jet chamber of 2 mm diameter and a nozzle exit tube of length 20 cm at a strand feed rate of 274 m/minute and an air pressure of 310 kiloPascals.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for a reinforced laminate comprising a matrix material and the fabric.

USE - For reinforced laminates (claimed) used in electronic packaging applications and as reinforcement for telecommunication cables.

ADVANTAGE - The composites or laminates formed from fiber strands woven into fabrics provides good wet-through and good wet-out properties of strands. The coating on the surfaces of fiber strands protect the fiber from abrasion and breakages during processing and provide good weavability particularly on air jet looms and increased productivity. The fiber strand is compatible with polymeric matrix material. The coated fiber glass strands have low fuzz and halos, low broken filaments, low strand tension, high pliability and low insertion time and facilitates weaving and knitting to provide fabric with few surface defects. The coated fiber strands facilitates thermal conduction along coated surfaces of fiber. When used as continuous reinforcement for electronic circuit boards, the coated glass fibers promotes heat dissipation from a heat source (such as chip or circuit) along the reinforcement to conduct heat away from electronic components and thereby inhibiting thermal degradation and/or deterioration of circuit components, glass fibers and polymeric matrix material. The coated glass fibers provide higher thermal conductivity

phase than matrix material, thereby reducing differential **thermal expansion** and warpage of electronic circuit board and improving solder joint reliability. Need for incorporating thermally conductive material in the matrix resin is avoided, hence laminate manufacturing operations are improved at low cost. The strands posses high strand openness (enlarged cross sectional area and the filaments of strand are not tightly bound to one another) which can facilitate penetration or wet-out of matrix material into the strand bundles. The laminates made from fiber strands has low coefficient of **thermal expansion**, good flexural strength, good interlaminar bond strength and good hydrolytic stability. Electronic supports and printed circuit boards formed from the fiber strands has good drillability and resistance to **metal** migration. Production cycle time is reduced, capital equipment is eliminated, fabric handling and labor cost are reduced and fabric quality and product properties are improved. Abrasive wear of fiber strands are inhibited when contacted with solid objects such as portions of winding, weaving or knitting device or by interfilament abrasion. The coating composition are substantially free of heat expandable particles. Good resin penetration is enabled into warp yarn bundles during lamination and improves overall hydrolytic stability of laminates and electronic supports by reducing or eliminating paths of ingress for moisture into the laminates and electronic supports. Electrical short failures due to formation of conductive anodic filaments when exposed under bias to humid condition, is reduced.

DESCRIPTION OF DRAWING(S) - The figure shows a perspective view of a coated fiber strand.
Fiber strand 10
Fibers 12
Coating 14
Surface 16
Particles 18
Dwg.1/13

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L44  ANSWER 16 OF 59  WPIX (C) 2002 THOMSON DERWENT
AN   2001-648328 [74]    WPIX
DNN  N2001-484465        DNC C2001-191272
TI   Production of high alumina piece involves firing green piece obtained by
     pressing green powder precursor containing magnesia and titania with
     alumina powder precursor.
DC   A81 L02 M22 P53
IN   PARKER, G E
PA   (ALEX-N) ALEX VENTURES LTD CO LLC; (PARK-I) PARKER G E
CYC  95
PI   WO 2001068552 A1 20010920 (200174)* EN   26p
        RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ
            NL OA PT SD SE SL SZ TR TZ UG ZW
         W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK
            DM DZ EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ
            LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD
            SE SG SI SK SL TJ TM TR TT TZ UA UG US UZ VN YU ZA ZW
     AU 2001040063 A  20010924 (200208)
     US 2002027315 A1 20020307 (200221)
     US 2002041062 A1 20020411 (200227)
ADT  WO 2001068552 A1 WO 2001-US7115 20010306; AU 2001040063 A AU 2001-40063
     20010306; US 2002027315 A1 Provisional US 2000-188506P 20000310, US
     2001-795886 20010228; US 2002041062 A1 Provisional US 2000-188506P
     20000310, Div ex US 2001-795886 20010228, US 2001-17432 20011214
FDT  AU 2001040063 A Based on WO 200168552
PRAI US 2001-795886   20010228; US 2000-188506P  20000310; US 2001-17432
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20011214
AB WO 200168552 A UPAB: 20011217
NOVELTY - 1-10 weight percent (wt.%) of each magnesia powder and titania powder precursors are added to alumina powder precursor. A green powder precursor obtained is mixed. A green piece is obtained by pressing green powder precursor. Residual moisture and organic material are removed from green piece. The green piece is then fired to cone 13, to obtain high-alumina piece at reduced sintering temperature.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for high-alumina pieces. An alumina precursor obtained by mixing 1-10 wt.% magnesia precursor and 1-10 wt.% of titania precursor to the alumina powder precursor, is formed into a desired shape. The shaped alumina precursor is fired to produce a non-vitreous high-alumina pieces having enhanced chemical stability.

USE - Production of high-alumina piece as a thermal spray material coating, and for manufacture of a **metal** matrix **composite material**.

ADVANTAGE - Dense high-alumina pieces are produced at lower sintering temperature. The high-alumina pieces are non-vitreous and have full density, increased resistance to chemical attack over a very broad pH range, uniform and linear **thermal expansion**, optical translucence, high-temperature corrosion resistance, and uniform grain size. The low-fired high-alumina material pieces can be subjected to pH conditions ranging from extremely alkaline (concentrated hot sodium hydroxide) to extremely acidic (hot concentrated hydrofluoric acid, sulfuric acid and hot hydrogen gas), with minimal corrosive effects. The high-alumina pieces are even resistant to dissolution and/or corrosion from prolonged immersion in molten aluminum. The high-alumina pieces have a very low rate of defect, allowing net shaped formability through green pieces forming and firing. The high-alumina pieces formed exhibit superior surface finish of about 8 rms. The low-fired high-alumina pieces do not require kiln furniture or spacers for separation and may be stacked directly in contact with one another for firing without risking fusing or other firing defects. Thermal spray coating of low-fired high-alumina material provide a tough ceramic wear resistant and corrosion resistant coating layer for mechanical or electrical applications without sensitivity to the application technique. The high resistance to dissolution in molten aluminum exhibited by low-fired alumina material allows **metal** matrix composite to be made by casting instead of more expensive cold pressed powder metallurgical process. The **metal** matrix composite made from low-fired high-alumina material has enhanced welded joint integrity, an expanded heat treatment range and higher manufacturing throughput.
Dwg.0/5

L44 ANSWER 17 OF 59 WPIX (C) 2002 THOMSON DERWENT
AN 2001-647346 [74] WPIX
DNN N2001-483637 DNC C2001-190982
TI Paper-making machine includes roll(s) comprising shell of first **composite material**, **metal** journal and head of second **composite material**.
DC F09 Q62
IN ANGEL, D H; GRAF, E X; WITTE, W
PA (VOIJ) VOITH SULZER PAPER TECHNOLOGY NORTH AMER
CYC 1
PI US 6299733 B1 20011009 (200174)* 5p
ADT US 6299733 B1 US 2000-589899 20000607
PRAI US 2000-589899 20000607
AB US 6299733 B UPAB: 20011217

NOVELTY - A paper-making machine has roll(s) (10) comprising a shell (14), a **metal** journal (16) and a head (18). The shell is made of first **composite material** having a first coefficient of **thermal expansion**, and the **metal** journal has an axis. The head is made of second **composite material** and has openings (20), each extending parallel to the journal axis.

DETAILED DESCRIPTION - A paper-making machine consists of roll(s) for carrying a fiber web or a belt. The roll comprises a shell of first **composite material** having a first coefficient of **thermal expansion**, a **metal** journal having an axis, and a head interposed between and interconnecting the shell and the journal. The head has openings, each extending parallel to the journal axis. At least one of the openings has a weight material. The head comprises a second **composite material** having a second coefficient of **thermal expansion**, which is approximately equal to the first coefficient of thermal coefficient.

USE - For forming fiber web, e.g. paper web.

ADVANTAGE - The paper-making machine utilizes roll which is lightweight, easy and inexpensive to manufacture and has a low rotational inertia during operation.

DESCRIPTION OF DRAWING(S) - The figure shows a side sectional view of a roll.

Roll 10
Shell 14
Metal journal 16
Head 18
Openings 20
Plugs 26
Dwg.1/2

L44 ANSWER 18 OF 59 WPIX (C) 2002 THOMSON DERWENT
AN 2001-389548 [41] WPIX
CR 1999-551017 [44]; 1999-551021 [44]; 1999-551022 [44]; 2000-350122 [27]; 2000-364682 [27]; 2001-244130 [14]; 2001-257406 [14]; 2001-257524 [17]; 2002-017346 [62]; 2002-034088 [62]; 2002-034089 [62]; 2002-041186 [62]; 2002-041187 [62]; 2002-041188 [62]; 2002-049008 [62]; 2002-049009 [62]
DNN N2001-286566 DNC C2001-118685
TI Reinforced laminate for an electronic support comprises a matrix material and at least one non-degreased fabric consisting of at least one strand containing several fibers.
DC A18 A28 A85 F06 L01 L03 V04
IN LAMMON-HILINSKI, K; LAWTON, E L; NOVICH, B E; RICE, W B; ROBERTSON, W J; VELPARI, V; WU, X
PA (PITT) PPG IND OHIO INC
CYC 91
PI WO 2001012701 A1 20010222 (200141)* EN 160p
RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ NL OA PT SD SE SL SZ TZ UG ZW
W: AE AL AM AT AU AZ BA BB BG BR BY CA CH CN CR CU CZ DE DK DM EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW
AU 2000063831 A 20010313 (200141)
EP 1204696 A1 20020515 (200239) EN
R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI
ADT WO 2001012701 A1 WO 2000-US20457 20000728; AU 2000063831 A AU 2000-63831 20000728; EP 1204696 A1 EP 2000-950780 20000728, WO 2000-US20457 20000728
FDT AU 2000063831 A Based on WO 200112701; EP 1204696 A1 Based on WO 200112701

PRAI US 2000-620523 20000720; US 1999-146337P 19990730; US 1999-146605P 19990730; US 1999-146862P 19990803; WO 1999-US21442 19991008; WO 1999-US21443 19991008; US 2000-183562P 20000218; US 2000-527034 20000316; US 2000-548379 20000412; US 2000-668916 20000511

AB WO 200112701 A UPAB: 20020621

NOVELTY - A reinforced laminate comprises: (a) a matrix material; and (b) at least one non-degreased fabric. The fabric comprises at least one strand containing several fibers. A portion of the fabric has a coating compatible with the matrix material.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are included for the following:

(A) a fabric in which the resin reactive diluent is a lubricant comprising at least one functional group selected from amine, alcohol, anhydride, acids or epoxy groups. The groups are capable of reacting with an epoxy resin system;

(B) forming a reinforced laminate by:

(i) obtaining a fabric by weaving a fill yarn and a warp yarn. The yarns have several fibers and resin compatible coatings on at least a portion of the yarns;

(ii) at least partially coating a potion of the fabric with a matrix material resin;

(iii) at least partially curing the coated fabric to form a prepreg layer; and

(iv) laminating at least two prepreg layers together to form the laminate;

(C) a prepreg for an electronic support, comprising (a) and (b);

(D) an electronic support comprising (a) on at least a portion of (b);

(E) forming an electronic support using steps (i)-(iii) and laminating at least one prepreg layer together with at least one electrically conductive layer to form the electronic support;

(F) an electronic circuit board comprising (1) the electronic support and (2) an electrically conductive layer, the support and the conductive layer being contained in the circuit board; and

(G) forming a printed circuit board by obtaining the electronic support and patterning at least one electrically conductive layer of the electronic support to form the printed circuit board.

USE - The coated fiber strands are useful in an air jet weaving process, in the manufacture of electronic supports, printed circuit boards. Fabrics made are useful in electronic packaging applications.

ADVANTAGE - The fiber strands have a unique coating that not only preferably inhibits abrasion and breakage of the fibers during processing but also provides good wet-through, wet-out and dispersion properties in the formation of composites. The coated fiber strands provide good processability in weaving and knitting. The coated fiber strands have a unique coating that can facilitate thermal conduction along coated surfaces of the fibers and preferably possess high strand openness. The laminates have low coefficient of **thermal expansion**, good flexural strength, good interlaminar bond strength and good hydrolytic stability.

Dwg.0/13

L44 ANSWER 19 OF 59 WPIX (C) 2002 THOMSON DERWENT
AN 2001-257415 [26] WPIX
DNC C2001-077457
TI Surface sheet for construction of articles useful in rail road vehicles comprises a second surface member having same **thermal expansion** coefficient that of stainless steel of a first member.
DC A14 A17 A21 A25 A92 A93 A95 M13 M14 P73

IN KIM, Y S; KIM, Y
PA (KOFI-N) HANKOOK FIBER GLASS CO LTD
CYC 89
PI WO 2001009404 A2 20010208 (200126)* EN 27p
RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW NL
OA PT SD SE SL SZ TZ UG ZW
W: AE AL AM AT AU AZ BA BB BG BR BY CA CH CN CR CU CZ DE DK DM EE ES
FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS
LT LU LV MD MG MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ
TM TR TT TZ UA UG US UZ VN YU ZA ZW
AU 9961255 A 20010219 (200129)
KR 2001011802 A 20010215 (200154)
ADT WO 2001009404 A2 WO 1999-KR610 19991011; AU 9961255 A AU 1999-61255
19991011; KR 2001011802 A KR 1999-31341 19990730
FDT AU 9961255 A Based on WO 200109404
PRAI KR 1999-31341 19990730
AB WO 200109404 A UPAB: 20010924

NOVELTY - A surface sheet (10) for construction comprises: a first surface member (12) consisting of stainless steel and a second surface member (14) attached to the back face of the first surface member. (14) exhibits the **thermal expansion** or shrinkage behavior similar to that of (12) and having mechanical properties similar to those of a **metal**.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is included for a sandwich structure having the two surface sheets joined through a core member. At least one of the surface sheets comprises a core (preferably honeycomb or foam core) member (32). (14) is placed between (12) and (32).

USE - For an article useful in railroad vehicles, containers, cabins, external decorative building materials, partitions and outdoor constructions (claimed).

ADVANTAGE - (14) function to reinforce the debonding resistance between (12) and (32) and at the same time supplements the mechanical properties of (12). The sheet has an excellent debonding resistance so that the first surface member of stainless steel assumes the function of preserving inherent surface, characteristics as the gracefulness, prolonged life, anti-corrosion and anti-erosion.

DESCRIPTION OF DRAWING(S) - The figure shows a cross a cross section of the surface sheet for construction.

surface sheet 10
first surface member 12
second surface member. 14

Dwg.1/6

L44 ANSWER 20 OF 59 WPIX (C) 2002 THOMSON DERWENT
AN 2001-244130 [25] WPIX
CR 1999-551017 [44]; 1999-551021 [44]; 1999-551022 [44]; 2000-350122 [27];
2000-364682 [27]; 2001-257406 [14]; 2001-257524 [17]; 2001-389548 [17];
2002-017346 [62]; 2002-034088 [62]; 2002-034089 [62]; 2002-041186 [62];
2002-041187 [62]; 2002-041188 [62]; 2002-049008 [62]; 2002-049009 [62]
DNN N2001-173823 DNC C2001-073162
TI Impregnated glass fiber strands for manufacturing fabrics and electronic supports comprise a resin compatible coating composition containing discrete particles, at least one lubricious material and a film-forming material.
DC A18 A28 A82 G02 L01 L03 U11 V04
IN LAMMON-HILINSKI, K; LAWTON, E L; NOVICH, B E; RICE, W B; ROBERTSON, W J;
VELPARI, V; WU, X
PA (PITT) PPG IND OHIO INC
CYC 91

PI WO 2001009054 A1 20010208 (200125)* EN 163p
RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ NL OA PT SD SE SL SZ TZ UG ZW
W: AE AL AM AT AU AZ BA BB BG BR BY CA CH CN CR CU CZ DE DK DM EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW
AU 2000062393 A 20010219 (200129)
EP 1204613 A1 20020515 (200239) EN
R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI

ADT WO 2001009054 A1 WO 2000-US20459 20000728; AU 2000062393 A AU 2000-62393 20000728; EP 1204613 A1 EP 2000-948977 20000728, WO 2000-US20459 20000728

FDT AU 2000062393 A Based on WO 200109054; EP 1204613 A1 Based on WO 200109054

PRAI US 2000-620526 20000720; US 1999-146337P 19990730; US 1999-146605P 19990730; US 1999-146862P 19990803; WO 1999-US21442 19991008; WO 1999-US21443 19991008; US 2000-183562P 20000218; US 2000-527034 20000316; US 2000-548379 20000412; US 2000-668916 20000511; US 2000-146862 20000720

AB WO 200109054 A UPAB: 20020621
NOVELTY - A partially coated fiber strand comprises fibers coated with a resin compatible coating composition. The coating composition comprises: several discrete particles formed from polymeric and non-polymeric organic, **inorganic** materials and/or **composite materials**; at least one lubricious material different from the discrete particles; and at least one film-forming material.

DETAILED DESCRIPTION - An at least partially coated fiber strand comprises fibers coated with a resin compatible coating composition on at least a portion of a surface of at least one of the fibers. The resin compatible coating composition comprises: (a) several discrete particles, (b) at least one lubricious material different from the discrete particles, and (c) at least one film-forming material. The discrete particles are formed from materials selected from non-heat expandable organic materials (1), **inorganic** polymeric materials (2) and a lamellar particle having a thermal conductivity of at least 1 Watt per meter K at a temperature of 300K (3) and/or non-heat expandable **composite materials** (4). The particles have an average particle size to allow wet out of the fiber strand. INDEPENDENT CLAIMS are also included for the following: 1) at least partially coated fiber strand comprising fibers coated with a coating containing (d) at least one organic component and (3); and 2) at least partially coated fiber strand comprising glass fibers coated with a resin compatible coating composition comprising (e) several lamellar **inorganic** materials having a mohr's hardness value that does not exceed the Mohr's hardness value of the glass fibers; and (f) at least one polymeric material.

USE - For manufacturing fabrics, laminates, electronic supports and printed circuit boards, by the thermosetting molding operations.

ADVANTAGE - The coating of the impregnated fibers inhibits abrasion and breakage of the glass fibers, is compatible with a wide variety of matrix materials, provides good wet-out and wet-through and have good dispersion properties through the matrix material. The coatings are compatible with modern air-jet weaving equipment. With the coatings the non-value added processing steps such as slashing, degreasing, de-oiling and finishing for removing non-resin compatible sizing materials, are eliminated in the fabric forming operation while maintaining the fabric quality required for electronic support applications. The coating also provides good laminate properties such as low coefficient of **thermal expansion**, good flexural strength, good interlaminar bond strength, laminate strength, thermal stability,

hydrolytic stability, low corrosion and reactivity in the presence of high humidity, reactive acids and alkalis. The coated fiber strands also provide good processability in weaving and knitting to provide a fabric with few surface defects for printed circuit board applications. The coated fiber strands have a unique coating facilitating thermal conduction along coated surfaces of the fibers and provide a mechanism to promote heat dissipation from a heat source along the reinforcement to conduct heat away from the electronic components and inhibit thermal degradation and/or deterioration of the circuit components, glass fibers and polymeric matrix material and also provide solder joint reliability. This improves laminate manufacturing operations and lowers costly matrix material supply tank purging and maintenance. The fiber strands also possess high strand openness i.e. with enlarged cross-sectional area and strands speciously bound to each other. The electronic circuit boards prepared with the fibers have good drill ability and resistance to **metal** migration low tool wear during drilling and good locational accuracy of drilled holes. The other advantages with the fibers are reduced production cycle time, elimination of capital equipment, reduced fabric handling and labor costs, good fabric quality and good final product properties.

DESCRIPTION OF DRAWING(S) - The figure shows a perspective view of a coated fiber strand at least partially coated with the coating composition.

coated fiber strand 10
fibers 12
layer of coating composition 14
surface of fibers 16,17
particles 18
size of the particles 19
spaces 21
adjacent fibers. 23,25
Dwg.1/13

L44 ANSWER 21 OF 59 WPIX (C) 2002 THOMSON DERWENT
AN 2001-194055 [20] WPIX
DNN N2001-138124 DNC C2001-058578
TI Silicon carbide powder for semiconductor devices shows specified ratio between heat conductivity values at two different temperatures.
DC L02 L03 P53 U11
PA (SUME) SUMITOMO ELECTRIC IND CO
CYC 1
PI JP 2000335914 A 20001205 (200120)* 11p
ADT JP 2000335914 A JP 1999-150856 19990531
PRAI JP 1999-150856 19990531
AB JP2000335914 A UPAB: 20010410

NOVELTY - Silicon carbide powder shows K25 value (heat conductivity at 25 deg. C) of 380 W/m.K. The ratio of K200 to K25 (heat conductivity at 200 deg. C) values of the powder is 54 % or more.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

(i) **composite material** obtained by dispersing silicon carbide powder in **metal** matrix; and

(ii) manufacture of silicon carbide powder by adding mixture of IVa group **metal**-powder to silicone carbide raw material and heating beyond the melting point of **metal** in inert gas atmosphere.

USE - Composite heat release substrate in semiconductor devices manufacture (claimed).

ADVANTAGE - The silicon carbide powder has high thermal conductance so the composite also has good thermal conductivity and low expansion coefficient unlike conventional silicon carbide composites. By using the

composite, semiconductor devices with a low **thermal expansion** coefficient are obtained so the material can be used without any problem in high output power modules under severe conditions.
Dwg.0/1

L44 ANSWER 22 OF 59 WPIX (C) 2002 THOMSON DERWENT
AN 2001-128052 [14] WPIX
DNN N2001-094561 DNC C2001-038005
TI **Composite material** for manufacture of semiconductor device such as IGBT, has **inorganic** compound particle which has predefined shape.
DC L03 M22 P53 U11
PA (HITA) HITACHI LTD
CYC 1
PI JP 2000313904 A 20001114 (200114)* 15p
ADT JP 2000313904 A JP 1999-121280 19990428
PRAI JP 1999-121280 19990428
AB JP2000313904 A UPAB: 20010312
NOVELTY - A **composite material** consists of **inorganic** compound particle and **metal**. The **inorganic** compound particle has **thermal expansion** coefficient smaller than that of **metal** 50% or less of compound particle has predefined shape.
DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:
(a) manufacturing method of **composite material**;
(b) semiconductor device
USE - For manufacture of semiconductor device such as IGBT.
ADVANTAGE - The **composite material** has high plastic working property with high heat conductivity and low **thermal expansion** coefficient.
DESCRIPTION OF DRAWING(S) - The figure shows the rolling sintering apparatus.
Dwg.1/16

L44 ANSWER 23 OF 59 WPIX (C) 2002 THOMSON DERWENT
AN 2001-084714 [10] WPIX
CR 2001-075385 [08]
DNN N2001-064774 DNC C2001-025194
TI **Composite materials** used in manufacture of parts that carry semiconductors comprise **metal** and **inorganic** compound composites.
DC L02 L03 M22 P53 U11
PA (HITA) HITACHI LTD
CYC 1
PI JP 2000313905 A 20001114 (200110)* 20p
ADT JP 2000313905 A JP 1999-121285 19990428
PRAI JP 1999-121285 19990428
AB JP2000313905 A UPAB: 20010220
NOVELTY - Homogeneously pressed and sintered **composite materials** made of **metals** and **inorganic** compounds particles whose **thermal expansion** coefficient is less than that of **metals**, and not less than 95 % and not greater than 50 % of the **inorganic** particles are connected to each other to form complex shapes and dispersed into the sintered materials.
USE - Used as devices or parts that carry semiconductors.
ADVANTAGE - High thermal conductive, low thermal expansive, and highly plastic **composite materials** can be obtained,

resulting in high workability and efficiency in manufacturing processes.
Dwg.0/23

L44 ANSWER 24 OF 59 WPIX (C) 2002 THOMSON DERWENT
AN 2001-073016 [09] WPIX
DNN N2001-055456 DNC C2001-020701
TI Silicon carbide powder used for manufacturing heat-dissipating substrates for semiconductor devices, has predetermined peak intensities according to X-ray diffraction.
DC E36 L03 U11
IN KAWAI, C
PA (SUME) SUMITOMO ELECTRIC IND CO
CYC 26
PI EP 1055641 A2 20001129 (200109)* EN 15p
R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI
JP 2000335913 A 20001205 (200112) 11p
ADT EP 1055641 A2 EP 2000-304501 20000526; JP 2000335913 A JP 1999-149026 19990528
PRAI JP 1999-149026 19990528
AB EP 1055641 A UPAB: 20010213
NOVELTY - The summation of peak intensities of X-ray diffraction peaks obtained on (101), (102), (103), (104) and (110) planes of 6H-type crystal grains of SiC powder in the Bragg angle 2 theta of 30-61 deg. is 90% or more of the summation of the peak intensities of all the X-ray diffraction peaks in the same range of Bragg angle when tested using the Cu-K alpha line.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

(a) a **composite material** comprising **metal** matrix dispersed with particles of SiC powder;

(b) a semiconductor device made of **composite material**; and

(c) manufacture of SiC powder involves adding a seed crystal powder to the SiC material powder to form a mixture which is heat-treated at 1800 deg. C or more in presence of an inert gas. The seed crystal powder has a larger average particle diameter than that of SiC material powder and contains 98% or more 6H-type crystal particles.

USE - For heat-dissipating substrate used for various devices and machines, especially for semiconductor devices which is used as high-output DC/AC converters and frequency changers.

ADVANTAGE - Silicon carbide powder with excellent thermal conductivity, is provided. Therefore, **composite material** having excellent thermal conductivity and low **thermal expansion** coefficient, is provided using SiC powder. The **composite material** withstands severe heat cycles and can be used as a heat sink material for high-output power modules and as enveloping material of semiconductor devices.

DESCRIPTION OF DRAWING(S) - The Figure is a schematic diagram of a semiconductor device incorporating the **composite material** of the invention as the substrate.
Dwg.1/2

L44 ANSWER 25 OF 59 WPIX (C) 2002 THOMSON DERWENT
AN 2001-047599 [06] WPIX
DNN N2001-036703
TI Lead frame for semiconductor device, is dispersed with **inorganic** compound particles in specified order.
DC U11

PA (HITA) HITACHI LTD
CYC 1
PI JP 2000311980 A 20001107 (200106)* 13p
ADT JP 2000311980 A JP 1999-121283 19990428
PRAI JP 1999-121283 19990428
AB JP2000311980 A UPAB: 20010126
NOVELTY - Lead frame (1) is made of a **composite material**
, with **inorganic** compound particles dispersed in a **metal**
. 95% of the particles are dispersed as a lump, having complicated shapes such that their cross-sectional area ratios form in an order.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for semiconductor device.

USE - Lead frame for semiconductor device e.g. large scale integration (LSI).

ADVANTAGE - The **inorganic** compound used has high thermal conductance, low **thermal expansion** and has high plastic working property.

DESCRIPTION OF DRAWING(S) - The figure shows the diagram of a resin sealed semiconductor device.
Lead frame 1
Dwg.3/3

L44 ANSWER 26 OF 59 WPIX (C) 2002 THOMSON DERWENT
AN 2001-042464 [06] WPIX
DNN N2001-031847 DNC C2001-012383
TI Preform for **metal** matrix composite comprises **inorganic** particles, and small- and large-diameter **inorganic** fibers with specified average diameters and lengths.
DC L02 M22 M27 P53 Q52
IN IIDA, T; IWATA, K; KANEDA, K; KAWAMOTO, S; KIMURA, K; KOBAYASHI, T; SHIMAMOTO, T; WADASAKO, M; YABUUCHI, S
PA (MITM) MITSUBISHI JIDOSHA KOGYO KK; (NIAS) NICHIAS CORP; (MITM) MITSUBISHI MOTOR CORP
CYC 29
PI EP 1059133 A1 20001213 (200106)* EN 14p
R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI
JP 2000355745 A 20001226 (200116) 8p
CN 1277319 A 20001220 (200121)
KR 2001007294 A 20010126 (200152)
US 6383656 B1 20020507 (200235)
ADT EP 1059133 A1 EP 2000-112401 20000609; JP 2000355745 A JP 1999-165117 19990611; CN 1277319 A CN 2000-118128 20000609; KR 2001007294 A KR 2000-31321 20000608; US 6383656 B1 US 2000-590265 20000609
PRAI JP 1999-165117 19990611
AB EP 1059133 A UPAB: 20010126
NOVELTY - A preform comprises **inorganic** particles, small-diameter **inorganic** fibers, and large-diameter **inorganic** fibers having average diameters of 1-50 mu m, 2-5 mu m, and 4-20 mu m, respectively. The average length of the small and large diameter fibers is 10-200 mu m. The small-diameter **inorganic** fibers catch and disperse the **inorganic** particles, while the large-diameter **inorganic** fibers create voids.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for a cylinder block having a cylinder liner made by impregnating the inventive preform including a porous structure with a metallic matrix.

USE - The preform is used in **metal** matrix **composite material**. It is impregnated with metallic matrix to make a cylinder liner. The cylinder liner is incorporated into a cylinder block

of an engine for automobile.
ADVANTAGE - The invention has a high abrasion resistance property. The preform can be easily made and the molten matrix **metal** can be easily impregnated into the preform, thus reducing the manufacturing cost. The cylinder liner and the cylinder block can be made of the same **metal**, so that their coefficients of **thermal expansion** can be made the same. They can be easily fit and the radiation property can be enhanced.
Dwg.0/4

L44 ANSWER 27 OF 59 WPIX (C) 2002 THOMSON DERWENT
AN 2000-560453 [52] WPIX
DNC C2000-167162
TI Corrosion-resistant material for use in plasma processing apparatus, consists of base comprising ceramics glass, **metal** or **metal** matrix composite, provided with magnesium oxide film.
DC E36
PA (ONOD) TAIHEIYO CEMENT CORP
CYC 1
PI JP 2000169974 A 20000620 (200052)* 5p
ADT JP 2000169974 A JP 1998-343661 19981203
PRAI JP 1998-343661 19981203
AB JP2000169974 A UPAB: 20001018
NOVELTY - A corrosion-resistant material consists of a base material on which a magnesium oxide film is formed. The base material is comprised of ceramics, glass, **metal** or **metal** matrix **composite material**.
USE - For use in semiconductor manufacturing apparatus, polyimide substrate manufacturing apparatus and liquid crystal plasma processing apparatus.
ADVANTAGE - The material has improved corrosion resistance when compared to conventional corrosion resistant material e.g. aluminum oxide material, **metal** and glass.
Dwg.0/0

L44 ANSWER 28 OF 59 WPIX (C) 2002 THOMSON DERWENT
AN 2000-441851 [38] WPIX
CR 2000-341701 [30]
DNC C2000-134129
TI Composite pressure-sintered material for making refractory pieces, e.g. in steel industry, comprises a continuous phase of hexagonal boron nitride dispersed with a second material, which has silicon, aluminum, or titanium nitrides.
DC L02 M24 P53
IN GUILLO, P; HOGGARD, D B
PA (VESU-N) VESUVIUS CRUCIBLE CO; (VESU-N) VESUVIUS GROUP SA
CYC 91
PI WO 2000030996 A2 20000602 (200038)* EN 10p
RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW NL OA PT SD SE SL SZ TZ UG ZW
W: AE AL AM AT AU AZ BA BB BG BR BY CA CH CN CR CU CZ DE DK DM EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG US UZ VN YU ZA ZW
AU 2000013678 A 20000613 (200043)
BR 9915502 A 20010807 (200152)
EP 1140730 A2 20011010 (200167) EN
R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI

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     SK 2001000666 A3 20011106 (200176)
     ZA 2001003709 A  20020130 (200217)#      18p
     KR 2001086446 A  20010912 (200219)
     HU 2001004140 A2 20020228 (200223)
     CN 1332707    A  20020123 (200231)
     CZ 2001001666 A3 20020417 (200231)
     MX 2001005046 A1 20010701 (200236)
ADT  WO 2000030996 A2 WO 1999-BE145 19991116; AU 2000013678 A AU 2000-13678
     19991116; BR 9915502 A BR 1999-15502 19991116, WO 1999-BE145 19991116; EP
     1140730 A2 EP 1999-972613 19991116, WO 1999-BE145 19991116; SK 2001000666
     A3 WO 1999-BE145 19991116, SK 2001-666 19991116; ZA 2001003709 A ZA
     2001-3709 20010508; KR 2001086446 A KR 2001-706178 20010516; HU 2001004140
     A2 WO 1999-BE145 19991116, HU 2001-4140 19991116; CN 1332707 A CN
     1999-813470 19991116; CZ 2001001666 A3 WO 1999-BE145 19991116, CZ
     2001-1666 19991116; MX 2001005046 A1 MX 2001-5046 20010518
FDT  AU 2000013678 A Based on WO 200030996; BR 9915502 A Based on WO 200030996;
     EP 1140730 A2 Based on WO 200030996; SK 2001000666 A3 Based on WO
     200030996; HU 2001004140 A2 Based on WO 200030996; CZ 2001001666 A3 Based
     on WO 200030996
PRAI EP 1998-123391    19981209; EP 1998-121935    19981119; ZA 2001-3709
     20010508
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AB WO 200030996 A UPAB: 20020610

NOVELTY - Composite pressure-sintered material comprises a continuous phase of hexagonal boron nitride dispersed with a second material, which has **metal** nitride(s) of silicon, aluminum, or titanium nitrides, and **metal** oxide(s) in an amount that gives the second material at most 35 wt.% oxygen.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for side dam plates comprising a refractory material.

USE - For use in the manufacture refractory pieces, which are submitted to severe corrosion and temperature conditions, e.g. pieces for metallurgic industry, particularly steel.

ADVANTAGE - The material possesses a low **thermal expansion** coefficient that reveals good thermal shock resistance and has low wettability by molten steel, which is responsible for excellent chemical resistance to the liquid **metal**, reducing the occurrence of steel solidification. It exhibits exceptional mechanical wear resistance.

Dwg.0/0

L44 ANSWER 29 OF 59 WPIX (C) 2002 THOMSON DERWENT

AN 2000-290872 [25] WPIX

CR 2000-169629 [15]

DNN N2002-149116 DNC C2002-060707

TI Hybrid drive shaft manufacturing method for motor vehicle transmission involves co-curing **metal** tube and **composite material** layer applied on **metal** tube.

DC A32 A88 Q36 Q62

IN BANG, G G; CHANG, S H; CHO, D H; CHOI, J K; KIM, Y G; LEE, D G; OH, J H; BAHNG, G G; CHOI, J G; BANG, K G; CHEON, S S; KIM, J K; KIM, P J; KWON, J W

PA (KOAD) KOREA ADV INST SCI & TECHNOLOGY

CYC 2

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PI   KR 99025778    A  19990406 (200025)*
     KR 241232      B1 20000201 (200118)
     US 6336986     B1 20020108 (200226)B      11p
ADT  KR 99025778 A KR 1997-47553 19970918; KR 241232 B1 KR 1997-47553 19970918;
     US 6336986 B1 US 1998-104109 19980625
PRAI KR 1997-47553     19970918; KR 1997-32643     19970714
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AB US 6336986 B UPAB: 20020424 ABEQ treated as Basic
NOVELTY - The method involves placing a **composite material** layer (112) on a **metal** tube (111) and placing a thermal shrinkage tube (113) on the **composite material** layer. The **metal** tube and the **composite material** layer are co-cured while exerting an axial compressive force on the **metal** tube, to prevent **thermal expansion** of the **metal** tube.
USE - For forming hybrid shaft adapted to be used as a drive shaft of transmission system of motor vehicle.
ADVANTAGE - The **metal** tube and **composite material** layer are adhered to each other by co-curing under a high pressurized atmosphere, thereby **metal** tube and composite layer cooperate with each other to exhibit good torque transmission capacity and high specific modulus respectively.
DESCRIPTION OF DRAWING(S) - The figure shows a plan view of hybrid drive shaft with the tube shown in a longitudinal section.
Metal tube 111
Composite material layer 112
Thermal shrinkage tube 113
Dwg.1/11

AB KR 99025778 A UPAB: 20020429
NOVELTY - The method involves placing a **composite material** layer (112) on a **metal** tube (111) and placing a thermal shrinkage tube (113) on the **composite material** layer. The **metal** tube and the **composite material** layer are co-cured while exerting an axial compressive force on the **metal** tube, to prevent **thermal expansion** of the **metal** tube.
USE - For forming hybrid shaft adapted to be used as a drive shaft of transmission system of motor vehicle.
ADVANTAGE - The **metal** tube and **composite material** layer are adhered to each other by co-curing under a high pressurized atmosphere, thereby **metal** tube and composite layer cooperate with each other to exhibit good torque transmission capacity and high specific modulus respectively.
DESCRIPTION OF DRAWING(S) - The figure shows a plan view of hybrid drive shaft with the tube shown in a longitudinal section.
Metal tube 111
Composite material layer 112
Thermal shrinkage tube 113
Dwg.1/11

L44 ANSWER 30 OF 59 WPIX (C) 2002 THOMSON DERWENT
AN 2000-288678 [25] WPIX
DNN N2000-217782 DNC C2000-087428
TI Plasma etching method, involves coating copper thin film surface by protective coat such that copper thin film surface is not contacted with halogen gas, subsequently plasma etching is carried out.
DC L03 U11 X25
PA (SONY) SONY CORP
CYC 1
PI JP 2000082695 A 20000321 (200025)* 45p
ADT JP 2000082695 A JP 1998-230753 19980817
PRAI JP 1998-186011 19980701; JP 1998-131631 19980514
AB JP2000082695 A UPAB: 20000524
NOVELTY - An exposed surface of copper thin film (43) is coated by a protective coat (44) such that the exposed surface of the copper thin film formed on base material is not contacted with halogen group gas during

plasma discharge. Subsequently, plasma etching of copper thin film is carried out on protective coat using halogen.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for semiconductor device which has insulation layer (41) carrying out coating of etching mask (45) pattern containing carbon atom on wiring containing barrier **metal** layer (42) and copper thin film which is formed on the base material. During plasma etching, the copper thin film does not decompose in the base material at high temperature. The dielectric constant of the insulating material in insulation layer is low which is 3.5 or less.

USE - For semiconductor device (claimed).

ADVANTAGE - Low resistance wiring is formed and electromigration-proof property is improved. Copper halogenation inside copper thin surface is suppressed. Plasma etching is not barred. Reduction of etching process tolerance of copper thin film is restrained. Copper thin film pattern having favorable anisotropic shape is formed. Corrosion generation of **composite material** by halogen group gas is prevented. Generation of **metal** pollution is prevented.

DESCRIPTION OF DRAWING(S) - The figure shows the partial cross-sectional views of the semiconductor substrates.

Insulating layer 41
Barrier **metal** layer 42
Copper thin film 43
Protective coat 44
Etching mask 45
Dwg.3/21

L44 ANSWER 31 OF 59 WPIX (C) 2002 THOMSON DERWENT
AN 1999-634011 [54] WPIX
DNC C1999-185257
TI Paper-board or finishing machine parts for doctor or coating blades and applicator bars used in surface sizing and film coating applications.
DC A35 A88 F09 L02 M13
IN LINTULA, T; TOIVANEN, H
PA (VALY) VALMET CORP
CYC 86
PI WO 9954520 A1 19991028 (199954)* EN 21p
RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW NL OA PT SD SE SL SZ UG ZW
W: AE AL AM AT AU AZ BA BB BG BR BY CA CH CN CU CZ DE DK EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MD MG MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT UA UG US UZ VN YU ZA ZW
FI 9800884 A 19991023 (200005)
AU 9934241 A 19991108 (200014)
ADT WO 9954520 A1 WO 1999-FI316 19990420; FI 9800884 A FI 1998-884 19980422; AU 9934241 A AU 1999-34241 19990420
FDT AU 9934241 A Based on WO 9954520
PRAI FI 1998-884 19980422
AB WO 9954520 A UPAB: 19991221

NOVELTY - The wear parts have wear-resistant physical vapor deposition (PVD) surface layer(s) containing (carbo) nitride and aluminonitride of titanium, chromium nitride, tungsten carbide or diamond-like coating material on a base material. A carrier layer obtained by electrolytic hard-chromium plating or auto-catalytic chemical nickel layer is interposed between base material and PVD layer.

DETAILED DESCRIPTION - The wear parts have wear-resistant physical vapor deposition (PVD) surface layer(s) containing (carbo)nitride and aluminonitride of titanium, chromium nitride, tungsten carbide or

diamond-like coating material on a base material. The base material is made of stainless steel, carbon steel, (non-)alloyed steel, thermosetting plastic, thermoplastic resin and **composite material**. A carrier layer obtained by electrolytic hard-chromium plating or auto-catalytic chemical nickel layer is interposed between base material and PVD layer. The thickness of carrier layer and PVD layer are 10-100 mu m and 0.5-25 mu m respectively.

An INDEPENDENT CLAIM is also included for the manufacture of wear parts of paper/board or finishing machines.

USE - For doctor/coating blade containing base material made of hardened steel, high-speed steel or sintered hard **metal** and for water drain rib of wire part or press section in paper/board or finishing machine containing base material made of (acid-proof) stainless steel and for applicator bar containing stainless steel base material (all claimed).

ADVANTAGE - The production cost is reduced since inexpensive base material is used. Hard and durable coating is applied on the base material. Cost of carrier layer formation is relatively reduced. Coating is uniformly performed. The product has excellent wear-resistant property and eliminates mechanical working, machining or finishing. The applicator bar has good surface quality, low porosity and low friction coefficient. Finishing of doctor or coating blade, whose **thermal expansion** coefficient is compatible with base material, is eliminated. Water drain ribs has excellent thermal shock property, good adhesion property and stability.

Dwg.0/0

L44 ANSWER 32 OF 59 WPIX (C) 2002 THOMSON DERWENT
AN 1999-442894 [37] WPIX
DNN N1999-330210 DNC C1999-130438
TI Ceramic-filled fluoropolymer composites used as an electrical substrate material, especially for microwave circuit boards.
DC A14 A28 A60 A85 L02 L03 P73 V04
IN ALLEN, D A; HORN, A F; TRASKOS, R R
PA (ROGR) ROGERS CORP
CYC 1
PI US 5922453 A 19990713 (199937)* 9p
ADT US 5922453 A US 1997-795857 19970206
PRAI US 1997-795857 19970206
AB US 5922453 A UPAB: 19990914

NOVELTY - An electrical substrate **composite material** comprises (a) a fluoropolymer matrix; (b) at least one particulate ceramic filler (greater than 30 vol.%); and (c) a high temperature, high modulus, polymeric powder of median particle size 200 psi m or less (2-30 vol.%), and the composite has a flexural modulus of greater than 200,000 psi.

USE - Especially as the dielectric substrate of a microwave circuit board, optionally clad with a **metal** layer on one or both sides.

ADVANTAGE - The substrate material shows a high flexural modulus and good dimensional stability. Replacing the matrix polymer with the high temperature polymeric material increases the modulus by nearly an order of magnitude with only a minor increase in dielectric loss and no adverse effects on the other advantageous properties of the ceramic-filled fluoropolymer composites.

Dwg.0/2

L44 ANSWER 33 OF 59 WPIX (C) 2002 THOMSON DERWENT
AN 1999-267576 [23] WPIX
DNC C1999-079574
TI Manufacture of **metal** ceramic **composite material** for machinery - comprises moulding and baking preform,

and permeating alloy mainly consisting of aluminium and magnesium at specific temperature in nitrogen gas current.
DC L02 M22
PA (NICF) NIPPON CEMENT KK; (SERA-N) SERANKUSU KK
CYC 1
PI JP 11080860 A 19990326 (199923)* 4p
ADT JP 11080860 A JP 1997-252678 19970903
PRAI JP 1997-252678 19970903
AB JP 11080860 A UPAB: 19990616
NOVELTY - An aluminium nitride powder of 1-150 mu m with 40- 80 vol% of powder filling factor, is added with an **inorganic** binder and the preform is molded and baked. The permeation of the base **metal** alloy consisting of mainly aluminium and 1-10 wt% of magnesium is carried out at 860-1000 deg. C in a nitrogen gas current.
USE - For manufacture of machinery in industries.
ADVANTAGE - Reduces magnesium contents and thereby improves heat resisting property. Possesses high rigidity, low **thermal expansion** property and antiwear quality.
Dwg.0/0

L44 ANSWER 34 OF 59 WPIX (C) 2002 THOMSON DERWENT
AN 1991-039674 [06] WPIX
DNN N1991-030486 DNC C1991-017041
TI Prepn. of moulded form for fibre reinforced **metal** composite - by mixing **inorganic** whiskers and organic fibre, heat compressing using punch in **metal** mould, removing some fibre, etc..
DC L02 M22 P53
PA (SUZM) SUZUKI MOTOR CORP
CYC 1
PI JP 02305932 A 19901219 (199106)*
ADT JP 02305932 A JP 1989-128392 19890522
PRAI JP 1989-128392 19890522
AB JP 02305932 A UPAB: 19930928
Prepn. comprises forming a predetermd. form by mixing **inorganic** material whiskers with organic fibre, heat-compressing using a punch in a **metal** mould, evapg. and removing the upper part of the organic fibre, after increasing volumetric content of whisker in the moulded form, solidifying with **inorganic** binder and removing remaining organic fibre by heating the whole moulded form.
ADVANTAGE - By evapg. and removing organic fibre mixed with whiskers, the volumetric content of the whiskers is continuously changed in the thickness direction. Thus when a **composite material** is prepd., high thermal stress at the boundary of the composite part and lightweight alloy material is prevented. The volumetric contents of whisker can easily and continuously be changed by only heating and compressing. Thus hardness, strength, **thermal expansion** coefft. and wear resistance, etc. can be adjusted as desired.
0/4

L44 ANSWER 35 OF 59 WPIX (C) 2002 THOMSON DERWENT
AN 1990-198939 [26] WPIX
DNN N1990-154696 DNC C1990-086364
TI Heat resistant member having composite reinforced portion - contg. reinforcing **inorganic** fibres.
DC L02 M22 P53 P55 Q52
IN SUZUKI, Y
PA (IZUM-N) IZUMI IND LTD; (IZUM-N) IZUMI KOGYO CO LTD
CYC 7
PI JP 02133534 A 19900522 (199026)*

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     US 5013610    A  19910507 (199121)#
     EP 447701     A  19910925 (199139)#
         R: DE FR GB IT SE
     EP 447701     B1 19950802 (199535)# EN   11p
         R: DE FR GB IT SE
     DE 69021369   E  19950907 (199541)#
ADT  JP 02133534 A JP 1988-285732 19881114; US 5013610 A US 1990-498708
     19900326; EP 447701 A EP 1990-302967 19900320; EP 447701 B1 EP 1990-302967
     19900320; DE 69021369 E DE 1990-621369 19900320, EP 1990-302967 19900320
FDT  DE 69021369 E Based on EP 447701
PRAI JP 1988-285732   19881114; US 1990-498708   19900326; EP 1990-302967
     19900320; DE 1990-621369   19900320
AB   JP  02133534 A UPAB: 19930928
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The heat resisting member consists of Al alloy of which portion subjected to heat loads locally is reinforced with **inorganic** fibres, and the Al matrix contains up to 1wt.% Si, Cu, Ni, and Mg, and up to 0.5wt.% Fe, and Mn, as impurities, and up to 0.3% other impurities.

The heat resisting member is made by making the Al-matrix, and the **inorganic** fibre **composite material** previously, followed by forming composite reinforced portion partially.

USE - For piston heads, and inter-valve portions of cylinder heads, having improved resistance to heat shock.

0/11

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L44  ANSWER 36 OF 59  WPIX (C) 2002 THOMSON DERWENT
AN   1989-094963 [13]   WPIX
DNC  C1989-042017
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TI Fibre-reinforced **inorganic composite material** - with adhesion promoting binder formed by hydrolysis and polycondensation of **metal** alkoxide.

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DC   L01 L02 P73
IN   ARFSTEN, N; BRUECKNER, R; HEGELER, H; KIEFER, W; PANNHORST, W; REICH, C;
     BRUCKNER, R
PA   (ZEIS) SCHOTT GLASWERKE; (ZEIS) ZEISS STIFTUNG CARL
CYC  10
PI   EP 308742     A  19890329 (198913)* DE   22p
         R: CH DE ES FR GB IT LI SE
     DE 3731650    A  19890330 (198914)         6p
     JP 01103935   A  19890421 (198922)
     DE 3731650    C  19890831 (198935)
     US 5079196    A  19920107 (199205)
     EP 308742     B1 19920826 (199235)  DE   30p
         R: CH DE ES FR GB IT LI SE
     DE 3874064    G  19921001 (199241)
     ES 2051807    T3 19940701 (199429)
ADT  EP 308742 A EP 1988-114737 19880909; DE 3731650 A DE 1987-3731650
     19870919; JP 01103935 A JP 1988-234673 19880919; US 5079196 A US
     1990-608432 19901220; EP 308742 B1 EP 1988-114737 19880909; DE 3874064 G
     DE 1988-3874064 19880909, EP 1988-114737 19880909; ES 2051807 T3 EP
     1988-114737 19880909
FDT  DE 3874064 G Based on EP 308742; ES 2051807 T3 Based on EP 308742
PRAI DE 1987-3731650  19870919
AB   EP    308742 A UPAB: 19930923
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In a fibre-reinforced **composite material** of **inorganic** sinterable material and **inorganic** fibres having high chemical and thermal resistance, high fracture toughness and bending rupture strength and low **thermal expansion**, in which the fibres are embedded in and bonded to a matrix of the sintered **inorganic** material, the novelty is that both the fibres and the

matrix material are encased with an adhesion promoting binder layer which is obtd. by thermal hydrolysis and polycondensn. of **metal** alkoxide(s) and which also acts as a chemical reaction barrier between the fibres and matrix material.

In the mfr. of **inorganic**, fibre-reinforced **composite materials** by continuously drawing **inorganic** fibres through a suspension of **inorganic** sinterable silicate powder in a fluidised bed, winding the coated fibres into overlying layers, drying and hot pressing, the novelty is that the suspension contains a **metal** alkoxide soln. already having hydrolysis and polycondensn. prods., the **metal** alkoxide(s) being completely hydrolysed and then poly-condensed on the fibres and the **inorganic** material to form adhesion promoting layers which, due to their high reactivity, facilitate sintering during hot pressing and act as reaction barriers between the fibres and the **inorganic** material.

USE/ADVANTAGE - Process is used to mfr. fibre-reinforced glasses and glass-ceramics. Optimal fibre-to-matrix adhesion is achieved in a simple manner.

0/4

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L44  ANSWER 37 OF 59  WPIX (C) 2002 THOMSON DERWENT
AN   1988-114097 [17]   WPIX
DNN  N1988-086700        DNC C1988-051094
TI   Biocompatible composite material - comprises substrate
     with surface-roughened layer of glass phase contg. hydroxy-apatite ceramic
     dispersed phase.
DC   D22 L02 P32 P34 P73
IN   BAN, S; ITO, H; IWATA, H; MARUNO, S
PA   (KUNO-I) KUNO S; (MARU-I) MARUNO S
CYC  15
PI   EP 264917      A  19880427 (198817)* EN   48p
        R: CH DE ES FR GB IT LI NL SE
     JP 63102762    A  19880507 (198824)
     CN 87107744    A  19880427 (198924)
     KR 9006891     B  19900924 (199150)
     US 5077132     A  19911231 (199204)
     JP 04003226    B  19920122 (199208)
     JP 06007425    A  19940118 (199410)          6p
     EP 264917      B1 19940316 (199411)  EN     33p
        R: CH DE ES FR GB IT LI NL SE
     DE 3789348     G  19940421 (199417)
     JP 06024585    B2 19940406 (199417)          6p
     ES 2061467     T3 19941216 (199505)
ADT  EP 264917 A EP 1987-115353 19871020; JP 63102762 A JP 1986-247592
     19861020; US 5077132 A US 1989-433415 19891107; JP 04003226 B JP
     1986-247592 19861020; JP 06007425 A Div ex JP 1986-247592 19861020, JP
     1991-214112 19861020; EP 264917 B1 EP 1987-115353 19871020; DE 3789348 G
     DE 1987-3789348 19871020, EP 1987-115353 19871020; JP 06024585 B2 Div ex
     JP 1986-247592 19861020, JP 1991-214112 19861020; ES 2061467 T3 EP
     1987-115353 19871020
FDT  DE 3789348 G Based on EP 264917; JP 06024585 B2 Based on JP 06007425; ES
     2061467 T3 Based on EP 264917
PRAI JP 1986-247592    19861020
AB   EP    264917 A UPAB: 19930923
     Biocompatible composite consists of a substrate with a ceramic layer of: a
     hydroxy-apatite ceramic phase (I) in which Ca:P mol ratio = 1.50-1.75. The
     surface of the layer is roughened, having voids and exposing (I). The
     layer pref. comprises sub-layers in which the content of (I) increases
     towards the layer surface; some sub-layers may have the same content of
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(I) as that of an adjacent sub-layer.
USE/ADVANTAGE - As a bone implant material for e.g. hip replacements, knee joints, dental fixings etc. Material has high bio-compatibility and mechanical strength and has low component dissolution.
0/11

L44 ANSWER 38 OF 59 WPIX (C) 2002 THOMSON DERWENT
AN 1988-057736 [09] WPIX
DNN N1988-043891 DNC C1988-025685
TI Heat conductive laminate with low **thermal expansion** - used e.g. for heat sinks, has layer(s) of **metal** and layer(s) of polymer composite contg. low **thermal expansion** reinforcing material.
DC A85 L03 P73 U11
IN MOGLE, R A; RODINI, B T; THAW, C L; ZWEBEN, C H
PA (GENE) GENERAL ELECTRIC CO
CYC 5
PI EP 257466 A 19880302 (198809)* EN 24p
R: DE FR GB
JP 63102927 A 19880507 (198824)
US 4888247 A 19891219 (199008) 20p
EP 257466 B 19920318 (199212) 32p
R: DE FR GB
DE 3777491 G 19920423 (199218)
ADT EP 257466 A EP 1987-111747 19870813; JP 63102927 A JP 1987-210393 19870826; US 4888247 A US 1986-900984 19860827; EP 257466 B EP 1987-111747 19870813
PRAI US 1986-900984 19860827
AB EP 257466 A UPAB: 19930923
A heat-conducting laminate comprises at least one layer of **metal** and at least one layer of a **composite material** comprising a polymer matrix (I) contg. embedded low **thermal expansion** reinforcing material (II).
USE/ADVANTAGE - The laminates have a low and/or a tailored coefft. of **thermal expansion** while maintaining high thermal conductivity, and are esp useful as heat sinks, heat dissipating devices and other heat transfer devices eg for use with electronic components and devices which avoid the occurrence of high thermal stresses in components such as diodes and transistors attached directly to the heat sink due to differential **thermal expansion** between the component and the heat sink.
7/9

L44 ANSWER 39 OF 59 WPIX (C) 2002 THOMSON DERWENT
AN 1986-162121 [25] WPIX
DNN N1986-120757 DNC C1986-069417
TI Material useful for substrate in thin film magnetic heads - comprises carbonaceous or graphite material and resin or **metal** binder.
DC A85 L03 M22 T03
IN HATANAI, T; MUKASA, K; NAKASHIMA, K; ONISHI, K
PA (ALPS) ALPS ELECTRIC CO LTD
CYC 1
PI US 4592963 A 19860603 (198625)* 5p
ADT US 4592963 A US 1984-661067 19841015
PRAI US 1983-513230 19830713; US 1984-661067 19841015
AB US 4592963 A UPAB: 19930922
Composite materials for use in the prepn. of substrates for thin film magnetic heads comprise 50-95 vol.% carbonaceous or graphitic carbon or a mixt. of these; and 5-50 vol.% of a binder pref.

a thermosetting or thermoplastic resin or a **metal**.

A substrate of the material for use in the prepn. of thin film magnetic heads, the substrate pref. being impregnated with a resin, a **metal** or a non-metallic **inorganic** cpd. is also claimed.

The pref. carbonaceous or graphitic material is natural graphite, synthetic graphite, coak, coke, oil coke, carbon black or coal powder. The **metal** binder is pref. iron, manganese, chromium, cobalt, titanium, molybdenum, tungsten or their alloy.

ADVANTAGE - The materials have good abrasion resistance, lubricity and thermal conductivity with a **thermal expansion** coefft. close to that of the materials used in the magnetic layer.
1/1

L44 ANSWER 40 OF 59 WPIX (C) 2002 THOMSON DERWENT
AN 1986-024655 [04] WPIX
DNN N1986-017957 DNC C1986-010313
TI Composite body of ceramic and **metal** - contains layer of buffer made of laminated sheets changing coefft. of **thermal expansion**.
DC L02 M23 P55
PA (HITA) HITACHI LTD
CYC 1
PI JP 60246276 A 19851205 (198604)* 4p
JP 02023501 B 19900524 (199025)
ADT JP 60246276 A JP 1984-98765 19840518; JP 02023501 B JP 1984-98765 19840518
PRAI JP 1984-98765 19840518
AB JP 60246276 A UPAB: 19930922
A composite body is made of ceramic and **metal**. The ceramic and the **metal** are joined each other to intermediate layer of buffer for thermal stress made of metallurgically joined, laminated, plural sheets. The coeffts. of **thermal expansion** of each sheets of the buffer are made so as to change consecutively from approx. value to that of ceramic for the sheet which contacts with the ceramic to approximate value to that of **metal** for the sheet which contacts with the **metal**.

The buffer is a **composite material** made up of **inorganic** fibre and metallic matrix. The buffer is made of carbon fibre and copper matrix, and coefft. of its **thermal expansion** is made to change consecutively in the direction of its thickness in the range between 4.10 power -6 and 12.10 power -6 deg.C.

The content of carbon fibre in the buffer is made to change consecutively from 60 vol.% to 30 vol.%.

USE/ADVANTAGE - It is a composite body made of ceramic and **metal**, which is prevented form the breaking caused by thermal stress, i.e. formation of cracks in ceramic is prevented, and sound joined body made of ceramic and **metal** having high thermal conductivity is produced easily.
0/3

L44 ANSWER 41 OF 59 WPIX (C) 2002 THOMSON DERWENT
AN 1985-300337 [48] WPIX
DNN N1985-223584 DNC C1985-130001
TI **Composite material** prodn. - by bonding **inorganic** materials to polyimide.
DC A26 A85 L03 U11 U12 V04 X15
PA (HITB) HITACHI CHEM CO LTD; (HITA) HITACHI LTD
CYC 1
PI JP 60208358 A 19851019 (198548)* 10p
PRAI JP 1984-63393 19840402

AB JP 60208358 A UPAB: 19930925
Composite materials are produced by bonding (1) **inorganic** materials to (2) polyimides contg. structural unit of formula (I) (where Ar1 is (II), (IV) or (IV), Ar2 is a tetravalent aromatic gp. R is lower alkyl, alkoxy, acyl, halogen; n is 0-4).
(2) Is prepd. by allowing benzidine, 3,3'-dimethylbenzidine, etc.. to react with aromatic tetracarboxylic acids or their derivs. e.g. pyromellitic acid in solvents e.g. N-methylpyrrolidone, cresol at 0-200 deg.C.
(1) is bonded to (2) directly or through adhesives or binders. Pref. the surface of (1) is coarsened or surface-treated with silane couplers, aluminium chelate, etc..
USE/ADVANTAGE - The **composite materials** comprise (1) e.g. **metals**, ceramics, glass and (2) having **thermal expansion** coefficients as small as (1) and excellent mechanical properties.
4/4

L44 ANSWER 42 OF 59 WPIX (C) 2002 THOMSON DERWENT
AN 1985-280310 [45] WPIX
DNN N1985-209129 DNC C1985-121455
TI **Composite material** reinforced locally with **inorganic** fibres - has boundary between composite with and without fibre reinforcement in contact with parent **metal**.
DC L02 M22 P73
PA (IZUM-N) IZUMI JIDOSHA KOGYO KK
CYC 1
PI JP 60190547 A 19850928 (198545)* 6p
ADT JP 60190547 A JP 1984-47397 19840312
PRAI JP 1984-47397 19840312
AB JP 60190547 A UPAB: 19930925
A **composite material** is used to make mechanical parts of engines. The novelty is that part of boundary between portions composite with and without the **inorganic** fibres, is contacted with a parent **metal** and is composited with one type of **inorganic** fibres. Part contacted with the part composite with the one type of **inorganic** fibres is composited with another type of **inorganic** fibres. The **thermal expansion** coeffts. of the parent **metal**, composite part with the one type of **inorganic** fibres and composite part with the other type are reduced in this order.
0/6

L44 ANSWER 43 OF 59 WPIX (C) 2002 THOMSON DERWENT
AN 1983-755931 [36] WPIX
DNC C1983-085466
TI High-density composite reinforced with organic fibre - comprises thermoplastic resin, **inorganic** filler, aromatic polyamide fibre and opt. reinforcing glass or carbon fibre etc..
DC A18 A28 A88 A94
PA (DAII-N) DAIICHI SEIKO CO LTD
CYC 1
PI JP 58127761 A 19830729 (198336)* 6p
PRAI JP 1982-9012 19820125
AB JP 58127761 A UPAB: 19930925
High-density **composite material** comprises 100 pts. wt. of (A) thermoplastic resin, 150-500 pts. wt. of one or two or more kinds of (B) **inorganic** filler, e.g. **metal** powder having specific density of above 3 and/or oxide, hydroxide, carbonate, sulphate,

better bearing properties, and/or changes in **thermal** conductivity, **thermal expansion** of electric resistance.

L44 ANSWER 45 OF 59 JAPIO COPYRIGHT 2002 JPO
AN 2001-201626 JAPIO
TI OPTICAL MEMBER
IN ARAMO KATSUHIDE; HORI MASAHIRO; NAKAMURA KOICHIRO; NAKAMA KENICHI; YAMAMOTO HIROAKI
PA NIPPON SHEET GLASS CO LTD
PI JP 2001201626 A 20010727 Heisei
AI JP2000-007092 (JP2000007092 Heisei) 20000114
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2001
AB PROBLEM TO BE SOLVED: To solve such problems that although quartz glass is excellent as a substrate material because of a small coefficient of **thermal expansion**, it has rather low adhesion property with an organic **inorganic composite material** and sometimes causes peeling after a fine rugged structure is formed by pressing a molding die and then released, and the production yield in the production of an optical member decreases as a nesult.
SOLUTION: A glass thin film 2 containing 5 to 15 mol% of monovalent or divalent **metal** elements is formed on the surface of a quartz substrate 1. By this method, when fine rugged patterns 3, 4 are formed by using a molding die on the organic **inorganic composite material** as the upper layer, peeling of the film is prevented and an optical device having a small temperature coefficient can be produced in a high production yield.
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L44 ANSWER 46 OF 59 JAPIO COPYRIGHT 2002 JPO
AN 2001-196513 JAPIO
TI **COMPOSITE MATERIAL**, METHOD OF PRODUCTION AND ITS USE
IN WATABE NORIYUKI; OKAMOTO KAZUTAKA; KONDO YASUO; ABE TERUYOSHI; AONO YASUHISA; KANEDA JUNYA
PA HITACHI LTD
PI JP 2001196513 A 20010719 Heisei
AI JP2000-009969 (JP2000009969 Heisei) 20000113
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2001
AB PROBLEM TO BE SOLVED: To provide a composite copper material excellent in plastic machining, a method of production, heat dissipation plate of a semiconductor device and a semiconductor device employing it.
SOLUTION: The composite copper material comprises a **metal** and a granular or rod-like **inorganic** compound, and contains 10-55 vol.% of cuprous oxide (Cu2O) and the remainder of copper (Cu), and has coefficient of **thermal expansion** of 5×10-6-17×10-6/°C and thermal conductivity of 100-380 W/m.k. It can be produced through a series of processes of melting, casting and machining and can be applied to the heat dissipation plate of a semiconductor device.
COPYRIGHT: (C)2001,JPO

L44 ANSWER 47 OF 59 JAPIO COPYRIGHT 2002 JPO
AN 2000-313904 JAPIO
TI **COMPOSITE MATERIAL**, ITS MANUFACTURE AND SEMICONDUCTOR DEVICE
IN KANEDA JUNYA; KONDO YASUO; OKAMOTO KAZUTAKA; ABE TERUYOSHI; AONO YASUHISA
PA HITACHI LTD
PI JP 2000313904 A 20001114 Heisei
AI JP1999-121280 (JP11121280 Heisei) 19990428

SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2000

AB PROBLEM TO BE SOLVED: To provide a **composite material** having high thermal conductivity, a low coefficient of **thermal expansion**, and high plastic workability, and its manufacturing method.
SOLUTION: The **composite material** contains a **metal** and particles of an **inorganic** compound having a smaller coefficient of **thermal expansion** than the **metal**. Plastic working is carried out simultaneously with sintering. Moreover, ≥95% or ≤50% of the whole compound particles are in an indefinate form where a plurality of particles are joined together. The **composite material** can be manufactured by feeding a powder mixture between heating rolls 2 and applying shaping and heating to it continuously or simultaneously.

L44 ANSWER 48 OF 59 JAPIO COPYRIGHT 2002 JPO
AN 2000-311973 JAPIO
TI **COMPOSITE MATERIAL** AND SEMICONDUCTOR DEVICE
IN KONDO YASUO; OKAMOTO KAZUTAKA; KANEDA JUNYA; ABE TERUYOSHI; AONO YASUHISA
PA HITACHI LTD
PI JP 2000311973 A 20001107 Heisei
AI JP1999-121284 (JP11121284 Heisei) 19990428
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2000

AB PROBLEM TO BE SOLVED: To ensure low **thermal expansion**, high **thermal** conductivity and easy workability while enhancing conformity with sealing resin by employing a **composite material** of a **metal** and particles of an **inorganic** compound having coefficient of **thermal expansion** smaller than that of the **metal** and dispersing a specified ratio of the compound particles as a mass of intricate shape coupled each other.
SOLUTION: As can be seen in an illustration of micro texture, Cu2O aggregates in mixing process and swells in sintering process but the grain size is 50 μm or less and a fine texture is provided where Cu phase of **metal** particles and Cu2O phase of **inorganic** compound particles having coefficient of **thermal expansion** smaller than that of the **metal** are dispersed uniformly. Substantially all Cu2O particles have grain size of 10 μm or less, a plurality of larger Cu2O particles are coupled and 50% or less of the entire particles are dispersed in cross-sectional area ratio. Such a **composite material** has a mixture textile of Cu phase having high thermal conductivity and Cu2O phase having low coefficient of **thermal expansion** and thereby exhibits both characteristics.

L44 ANSWER 49 OF 59 JAPIO COPYRIGHT 2002 JPO
AN 2000-007456 JAPIO
TI HIGHLY HEAT CONDUCTIVE CERAMIC **METAL COMPOSITE MATERIAL**
IN NAKAMURA MASATERU; KAMIYA SUMIO
PA TOYOTA MOTOR CORP
PI JP 2000007456 A 20000111 Heisei
AI JP1998-193648 (JP10193648 Heisei) 19980625
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2000

AB PROBLEM TO BE SOLVED: To provide a highly heat conductive ceramic **metal composite material** provided with strength that a porous sintered compact is not ruptured by the pressure at

the time of impregnating the material with a molten **metal** and rigidity capable of sufficiently suppressing the **thermal expansion** of the whole **composite material**, and capable of sufficiently securing heat radiating action.
SOLUTION: In this **composite material** for a **heat expansion** compatible layer to be joined between a ceramic member such as a ceramic substrate for electron device and a metallic member such as a heat sink, a metallic phase composed of a high heat conducting **metal** having higher heat conductivity than that of the metallic member is distributed isotropically or orientationally in the porous sintered compact obtained by sintering a powdery particle of a high heat conducting ceramic having higher conductivity than that of the ceramic member substantially without providing an interposed phase derived from an **inorganic** binder or with the interposed phase.

L44 ANSWER 50 OF 59 JAPIO COPYRIGHT 2002 JPO
AN 1997-260556 JAPIO
TI HEAT RADIATING MATERIAL FORSEMICONDUCTOR SUBSTRATE
IN HIROKAWA NORIKO; KAYAMOTO TAKASHI
PA NHK SPRING CO LTD, JP (CO 000464)
PI JP 09260556 A 19971003 Heisei
AI JP1996-93416 (JP08093416 Heisei) 19960322
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 97, No. 10
AB PURPOSE: TO BE SOLVED:To provide the **composite material** of metallic material and **inorganic** material, which has the same property as Cu-W alloy at low costs.
CONSTITUTION: heat radiating material consists of the **composite material** containing 20wt.% or more silicon carbides and copper powder, and the **thermal expansion** coefficient is 6.times.10-6 to 11.times.10-6/K or under, and Ag, Sn, and Si are added individually or by 0.3 to 8wt.% as (Ag+Sn) or (Ag+Si) to the said **composite material** for improvement of sintering density.
Hereby, heat radiating member having excellent property can be obtained from the point of silicon carbide being inexpensive, the point of a three-dimensionally isotropic sintered substance high in density with small cavities being obtained, the point of it being excellent in heat conductivity since silicon carbides excellent in heat conductivity are mixed into a copper matrix, the point of **thermal expansion** coefficient being capable of being adjusted by changing the mixture ratio of copper to silicon carbides, the point of the complex between copper and silicon carbides being relatively light, and others.

L44 ANSWER 51 OF 59 JAPIO COPYRIGHT 2002 JPO
AN 1997-237972 JAPIO
TI MULTILAYERED WIRING BOARD
IN HAYASHI KATSURA; NISHIMOTO AKIHIKO; HIRAMATSU KOYO; SASAMORI RIICHI
PA KYOCERA CORP, JP (CO 358923)
PI JP 09237972 A 19970909 Heisei
AI JP1996-42523 (JP08042523 Heisei) 19960229
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 97, No. 9
AB PURPOSE: TO BE SOLVED:To have durability in response to superfining of a circuit and requirements of precision as a wiring board such as a package, etc., to which a semiconductor element is mounted.
CONSTITUTION: multilayered wiring board 1 in which there are stacked in a multilayer an insulation layer 2 composed of a **composite material** mixing uniformly an **inorganic** filler with

organic resin; and a conductive circuit 3 composed of a low resistance **metal**, the coefficient of **thermal expansion** of an insulation layer 4 of an outermost layer is smaller than that of an internal insulation layer 5. For instance, **inorganic** filler contents of low **thermal expansion** in the insulation layer 4 of an outenrmost layer are larger than that in the internal insulation layer 5, preferably the coefficient of **thermal expansion** of the outermost layer at room temperature to 250.degree.C is controlled to be 10 to 60.times.10-6/.degree.C and the internal insulation layer 30 to 100.times.10-6/.degree.C. Further, a semiconductor element is mounted onto an upper face of the insulation layer 4 of an outermost layer.

L44 ANSWER 52 OF 59 JAPIO COPYRIGHT 2002 JPO
AN 1997-153666 JAPIO
TI BOARD FOR CHIP MOUNTING AND MANUFACTURE THEREOF
IN YOKOUCHI KISHIO; ABE TOMOYUKI
PA FUJITSU LTD, JP (CO 000522)
PI JP 09153666 A 19970610 Heisei
AI JP1995-312306 (JP07312306 Heisei) 19951130
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 97, No. 6
AB PURPOSE: TO BE SOLVED:To facilitate manufacturing of a board for chip mounting that has a low coefficient of **thermal expansion** , high **thermal** conductivity and large size by employing as the material of the board a **metal** group **composite material** that has a **metal** of high thermal conductivity as matrix and contains a non-**metal inorganic** material having a small coefficient of **thermal expansion** in the matrix.
CONSTITUTION: er resin and solvent are added to SiC particles 1a, 1b mixed in a rotary drum 2, and the materials are kneaded. The kneaded product is molded into a tape shape, and is cut to obtain square plate-like green sheets. The green sheets are fired in the air at 300.degree.C to form plate-like molded bodies 3. The molded bodies 3 are placed in a mold 5 made of graphite, and molten **metal** of Al-Si alloy at 700.degree.C is filled under pressure to impregnate the molded bodies 3 with Al-Si alloy. Warps and undulation in the **metal** group **composite material** 7 are removed by hot pressing 10 a nitrogen atmosphere at 600.degree.C to turn the **metal** group **composite material** into a flat board. The **metal** layer 6 is removed from the surface of the flat board.

L44 ANSWER 53 OF 59 JAPIO COPYRIGHT 2002 JPO
AN 1996-157735 JAPIO
TI PRODUCTION OF ORGANIC/**INORGANIC** COMPOSITE POLYMER
IN OKUBO TAKESHI; TANJI HIROAKI
PA HOYA CORP, JP (CO 330074)
PI JP 08157735 A 19960618 Heisei
AI JP1994-303427 (JP06303427 Heisei) 19941207
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 96, No. 6
AB PURPOSE: To produce an organic/**inorganic** composite polymer improved in transparency by subjecting an organic/**inorganic composite material** containing a **metal** oxide obtained by performing the hydrolysis and subsequent dehydrative condensation of a **metal** alkoxide in the presence of an organic monomer and an organic monomer to a polymerization treatment.
CONSTITUTION: An organic monomer (e.g. (meth)acrylamide) in an amount of

10 pts.wt. selected from monomers having amide bonds, imide bonds, urethane bonds or urea bonds and 10-4-40 pts.wt. alkoxide of a **metal** selected from Si, Ti, Zr, etc., (e.g. silicon tetraoxide) are dissolved in a 1-4C alcohol solvent, a catalyst (e.g. 1.times.10-1 to 10 N aqueous ammonia solution) is added to the solution, and the resultant mixture is subjected to hydrolysis and dehydrative condensation at 25-150.degree.C. The alcohol, water and NH3 are distilled off to obtain an organic/**inorganic composite material** containing the **metal** oxide and the organic monomer. A mixture formed by adding a radical polymerization initiator to the **composite material** is poured into a mold and polymerizad by heating to a predetermined temperature to obtain an organic/ **inorganic** composite polymer molding being small in the dependency of a coefficient of linear **thermal expansion** and a refractive index on temperature and having excellent transparency.

L44 ANSWER 54 OF 59 JAPIO COPYRIGHT 2002 JPO
AN 1995-223876 JAPIO
TI FIBER-REINFORCED **COMPOSITE MATERIAL**, PRODUCTION THEREOF AND MEMBER USING THE SAME
IN YASUTOMI YOSHIYUKI; KIKUCHI SHIGERU; MIYATA MOTOYUKI; KANAI TSUNEYUKI; SAWAI YUICHI
PA HITACHI LTD, JP (CO 000510)
PI JP 07223876 A 19950822 Heisei
AI JP1994-138533 (JP06138533 Heisei) 19940621
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 95, No. 8
AB PURPOSE: To safely obtain a fiber-reinforced **composite material** having a high strength and toughness without causing pollution by compounding an **inorganic** fiber bundle with ceramics or a **metal** and reinforcing the ceramics or **metal** therewith.
CONSTITUTION: This fiber-reinforced **composite material** is obtained by selecting an **inorganic** fiber bundle which is a fiber group of .gtoreq.20 oriented fibers having .gtoreq.0.05mm diameter of the fiber bundle within the range expressed by the formula (D is the diameter (mm) of the fiber bundle; D'=(0.011V-0.023).times..DELTA..alpha..times.106 (V is 3-30) or D'=(0.0375V-0.818).times..DELTA..alpha..times.106 (V is 30-60); V is the content (vol.%) of the fiber bundle; Aa is the difference in **thermal expansion** coefficient between the matrix ceramics and the fiber bundle (/.degree.C)) and .gtoreq.1200 aspect ratio from **inorganic** fiber bundles, then blending the resultant **inorganic** fiber bundle having af **thermal expansion** coefficient with ceramics having a. **thermal expansion** coefficient to be a matrix so as to provide .alpha.m>.alpha.f, forming the resultant blend and solidifying the formed blend. The obtained fiber-reinforced **composite material** is used to produce gas turbine parts, etc.

L44 ANSWER 55 OF 59 JAPIO COPYRIGHT 2002 JPO
AN 1994-032614 JAPIO
TI REFRACTORY COVERING MATERIAL
IN INOUE KAZUKI
PA AMUKO ENTERP KK, JP (CO)
PI JP 06032614 A 19940208 Heisei
AI JP1992-210922 (JP04210922 Heisei) 19920715
SO PATENT ABSTRACTS OF JAPAN, Unexamined Applications, Section: C, Sect. No. 1198, Vol. 18, No. 248, P. 152 (19940512)

AB PURPOSE: To provide a refractory covering material having excellent handleability in transportation and remarkably improved workability at the construction site by forming a refractory coating layer exhibiting sufficient fire resistance and having a prescribed surface hardness.
CONSTITUTION: The objective refractory covering material for covering the surface of a steel material is produced by compounding (A) an **inorganic** binder with (B) at least one kind of a substance selected from an alkali **metal** titanate expressed by the general formula M2O.cntdot.nTiO2 (M is alkali **metal**; (n) is integer of .gtoreq.4), (C) at least one kind of a substance selected from an **inorganic thermal expansion** material and a **thermal expansion** material consisting of a **composite material** of an organic material and an **inorganic** material and (D) at least one kind of material selected from an **inorganic** binding material having high melting point and a sintering assistant.

L44 ANSWER 56 OF 59 JAPIO COPYRIGHT 2002 JPO
AN 1991-189430 JAPIO
TI DISC BRAKE ROTOR OF METALLIC GROUP **COMPOSITE MATERIAL**
IN ICHIKAWA SHIGERU; MIYAKE JOJI; MIURA HIROHISA; OKAMOTO MAMORU; TSUCHIYA SHOICHI
PA TOYOTA MOTOR CORP, JP (CO 000320)
PI JP 03189430 A 19910819 Heisei
AI JP1989-329900 (JP01329900 Heisei) 19891220
SO PATENT ABSTRACTS OF JAPAN, Unexamined Applications, Section: M, Sect. No. 1179, Vol. 15, No. 447, P. 57 (19911114)
AB PURPOSE: To improve the durability of a brake rotor by constituting the brake rotor with a composite **metal** material of 10 to 15% volume rate comprising a matrix of Al alloy and a reinforcing member of an **inorganic** material having a **thermal expansion** factor less than the Al alloy.
CONSTITUTION: A disc part 14 comprises two annular plate parts 18 and 20, and a plurality of ribs 22 extended radially and positioned remotely from each other peripherally for integrally connecting the aforesaid plate parts 18 and 20. A rotor body 12 is constituted with a **composite material** having a matrix of Al alloy and a reinforcing member of an **inorganic** material, for example, SiC particles (average grain size of about 10.mu.m) of a **thermal expansion** factor less than the aforesaid Al alloy. The annular plate parts 18 and 20 are covered with a friction resistance layer 24 and this layer 24 determines a surface area 26 in slidable contact with a pad.

L44 ANSWER 57 OF 59 JAPIO COPYRIGHT 2002 JPO
AN 1988-312929 JAPIO
TI PRODUCTION OF FIBER **COMPOSITE MATERIAL**
IN KUWABARA MITSUO
PA HONDA MOTOR CO LTD, JP (CO 000532)
PI JP 63312929 A 19881221 Showa
AI JP1987-149748 (JP62149748 Showa) 19870615
SO PATENT ABSTRACTS OF JAPAN, Unexamined Applications, Section: C, Sect. No. 585, Vol. 13, No. 156, P. 115 (19890414)
AB PURPOSE: To prevent the deformation of fibers due to **thermal expansion**, etc., and to improve the fiber volume ratio by executing the calcination and elution of an auxiliary **inorganic** binder to the fiber molded body molded by reinforcing fibers, an **inorganic** binder and specific auxiliary **inorganic** binder and thereafter pressurizing and packing molten **metals** thereto.
CONSTITUTION: The primary fiber molded body is molded by the reinforcing

fibers, **inorganic** binder and auxiliary **inorganic** binder which exhibits bonding strength at the temp. lower than the temp. of exhibiting the bonding strength in the **inorganic** binder and is eluted by acid. Said molded body is calcined at said temp. of exhibiting the bonding strength in the **inorganic** binder to obtain the secondary fiber molded body. Said molded body is immersed into an acid soln. and the auxiliary **inorganic** binder is eluted away. The molten **metals** are pressurized and packed into the secondary fiber molded body after subjected to said removing treatment and the fiber **composite material** is obtd. By this method, the fibers are mutually bonded tightly via the boding strength of the auxiliary **inorganic** binder at the time of warming the fiber molded body in the case of calcination stage, by which the deformation of the fiber molded body is prevented and the fiber volume ratio of the **composite material** can widely be controlled according to the choice of the compounding ratio of the auxiliary **inorganic** binder.

L44 ANSWER 58 OF 59 JAPIO COPYRIGHT 2002 JPO
AN 1986-157647 JAPIO
TI MANUFACTURE OF ALUMINUM QUALITY STRENGTHENED **COMPOSITE MATERIAL**
IN KANDA TETSUO; SUZUKI NOBUYUKI; TANAKA KENICHI
PA NIPPON LIGHT METAL CO LTD, JP (CO 000474)
PI JP 61157647 A 19860717 Showa
AI JP1984-274441 (JP59274441 Showa) 19841228
SO PATENT ABSTRACTS OF JAPAN, Unexamined Applications, Section: C, Sect. No. 389, Vol. 1, No. 362, P. 52 (19861204)
AB PURPOSE: To develop the titled material superior in various characteristics, by adding and permeating pressedly molten Al or Al alloy, to material in which solid particles for strengthening material are adhered and mixed into wool ball shaped **inorganic** fiber materials.
CONSTITUTION: **Inorganic** fibers having 1-10.mu.m diameter such as fibers of alumina, carbon, ceramic are dispersed and stirred in water to form wool ball shaped coagulation particles having 0.5-10mm diameter in .gtoreq.90% thereof. Granular solid particles such as C, Pb, Si3N4, Al2O3, SiC as strengthening solid particle having 1-100.mu.m diameter in .gtoreq.80% thereof are added, mixed into said wool ball shaped particles by about 0.1-3 times ratio, and the mixture is pressed in a suitable **metal** vessel. Molten Al or Al alloy is added thereto, these are pressed, permeated and solidified to manufacture the titled material superior in physical, mechanical properties such as high temp. strength, wear resistance, **thermal expansion** coefft.

L44 ANSWER 59 OF 59 JAPIO COPYRIGHT 2002 JPO
AN 1983-214103 JAPIO
TI PRODUCTION OF REFLECTOR SURFACE MATERIAL
IN YAMANOI HIROSHI; SHIMIZU HIDETOSHI; ISHIKAWA REIJI
PA SONY CORP, JP (CO 000218)
PI JP 58214103 A 19831213 Showa
AI JP1982-96290 (JP57096290 Showa) 19820607
SO PATENT ABSTRACTS OF JAPAN, Unexamined Applications, Section: P, Sect. No. 264, Vol. 8, No. 681, P. 8 (19840330)
AB PURPOSE: To obtain a reflector surface material which excels in the size accuracy, reflection factor and smoothness with stable temperature characteristcs, by controlling the thermosetting process of a polymer **composite material** obtained by mixing an inorgaic filler into synthetic resin and therefore eliminating the use of a release agent.

CONSTITUTION: A glass rod 1 having a rotary paraboloid 2 which is polished with high accuracy and washed is used as a mold material. A thin film 3 of a **metal** (Al, Ag, Au, Cu, etc.) having a high reflection factor is formed on the paraboloid 2. Then the film 3 is transcribed to a polymer **composite material** 4. The material 4 is obtained by mixing an **inorganic** filler such as alumina, graphite, glass beads, etc. into synthetic resin such as epoxy resin, unsaturated polyester resin, etc. If the material 4 contains an **inorganic** filler of glass beads, the **heat expansion** coefficient is reduced to decrease the heat deformation due to the heating and cooling processes. Thus, easy exfoliations as well as the highly accurate transcription of a curved surface is facilitated.

L50 ANSWER 1 OF 1 WPIX (C) 2002 THOMSON DERWENT
AN 1991-255751 [35] WPIX
DNN N1991-194858 DNC C1991-110809
TI Thin magnetic film without partial wear - has glass coating based on oxide(s) of silicon, aluminium, zinc, titanium, magnesium and lead.
DC L03 M13 T03 V02
IN INOUE, S; ITO, F; KUSANO, Y; MAKINO, K; MATSUDA, T
PA (CANO) CANON KK
CYC 2
PI JP 03165305 A 19910717 (199135)*
US 5136447 A 19920804 (199234) 8p
ADT JP 03165305 A JP 1989-306072 19891122; US 5136447 A US 1990-615886 19901120
PRAI JP 1989-306072 19891122
AB JP 03165305 A UPAB: 19930928
Magnetic head having at least one magnetic thin film (MTF), a substrate for MTF, a protection plates holding the substrate and MTF at inside. At least a part of the substrate or MTF made of a crystalline glass having 800-1100 kg/sq.mm of Vicker's hardness of which a heat treated glass contg. oxides of 42-52 wt.% SiO2, 28-38 wt.% Al2O3, 5-15 wt.% ZnO, 5-15 wt.% TiO2, up to 10 wt.% MgO and PbO. Pref. MTF is a **metal** magnetic film (MMF), an **inorganic** cpd. is used as insulating layer between MMF and a coil. The substrate and MMF are combined by an **inorganic** glass having up to 120 x 10 power -7/deg. of coefficient of **thermal expansion** (CTE), and the crystalline glass has 120-140 x 10 power-7/deg. of CTE.

ADVANTAGE - The head has no partial wear and damage on a magnetic recording media.

1/3

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SYSTEM:OS  - DIALOG OneSearch
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See HELP NEWS 305.
  File 315:ChemEng & Biotec Abs  1970-2001/Dec
         (c) 2002 DECHEMA
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Set	Items	Description
S1	262705	COMPOSITE?()MATERIAL?
S2	91950	(THERMAL? OR HEAT???)(2N)(EXPANSION? OR DILATION?)
S3	3	VICKER?()HARD???
S4	169	AGGREGATE?(2N)ELONGAT?
S5	41	RADIATOR()PLATE?
S6	14621	(CONDUCTIVE?)(2N)(FILM? ? OR LAYER? OR COAT????)
S7	1102826	COPPER OR CU
S8	116792	(COPPER OR CU)(W)(OXIDE OR O OR MONOOXIDE OR (MONO()OXIDE)) OR CUO
S9	4814	CI=(CU SS(S) O SS)(S)NE=2
S10	10800	(NICKEL OR NI)(W)PLAT????
S11	3	S3
S12	3	RD (unique items)
S13	6749	S1 AND S2
S14	0	S13 AND S5
S15	10	S13 AND (S8 OR S9)
S16	10	RD (unique items)
S17	10	S16 NOT S11
S18	6	S13 AND S10
S19	6	RD (unique items)
S20	6	S19 NOT (S11 OR S15)
S21	147	S13 AND METAL AND INORGANIC
S22	145	RD (unique items)
S23	0	S22 AND S6
S24	0	S22 AND AGGREGATE? ?
S25	2	S22 AND (CROSS()SECTION?)
S26	2	S25 NOT (S11 OR S15 OR S19)
S27	2	S22 AND S10
S28	0	S27 NOT (S11 OR S15 OR S19 OR S25)
S29	28	S22 AND S7
S30	24	S29 NOT (S11 OR S15 OR S19 OR S25)
S31	786	S1 AND (S7 AND S8)
S32	801	S1 AND (S7 AND (S8 OR S9))
S33	9	S32 AND S2
S34	0	S32 AND S10
S35	1	S32 AND S6
S36	1	S35 NOT (S11 OR S15 OR S19 OR S25 OR S30)
S37	2	S5 AND (S7:S10)
S38	0	S36 NOT (S11 OR S15 OR S19 OR S25 OR S30 OR S35)

12/3,AB/1 (Item 1 from file: 8)
DIALOG(R)File 8:Ei Compendex(R)

02725328
E.I. Monthly No: EI8904034721
Title: Formation process of alloy phases by reaction diffusion between thermal sprayed aluminium and substrate of Armco iron and carbon steel.
Author: Oki, Sachio; Kamachi, Kazuyoshi; Gohda, Susumu; Hirata, Yoshito
Corporate Source: Kinki Univ, Higashiosaka, Jpn
Source: Nippon Kinzoku Gakkaishi/Journal of the Japan Institute of Metals v 52 n 10 Oct 1988 p 999-1005
Publication Year: 1988
CODEN: NIKGAV ISSN: 0369-4186
Language: Japanese
Abstract: In this study 99.9% aluminum was thermal sprayed on 0.25%C (S25C) and 0.55%C (S55C) steels by the wire arc spraying method. Armco iron specimens were also coated with aluminum to examine the effect of carbon on the diffusion process. The specimens were heat treated from 923 to 1123 K for 3.6 and 10.8 ks. The microstructure and **Vickers hardens** were examined. Diffusion of aluminum into the substrates and diffusion of iron from the substrate occurred. Intermetallic compounds of Fe-Al were formed and the total thickness of the alloy phases formed by heat treatment at 923 K for 10.8 ks was about 250 mu m. Several intermetallic compounds in the alloy layer were identified by the X-ray diffraction method. The compounds of Fe-Al were formed and the total thickness of the alloy phases formed by heat treatment at 923 K for 10.8 ks was about 250 mu m. Several intermetallic compounds in the alloy layer were identified by the X-ray diffraction method. The compounds were arranged in order of stoichiometric atomic ratio in the interface zone between the coated aluminum layer and the substrate, and the Fe//2Al//5 phase was predominant over other phases. The maximum value of the Vickers hardnessof the diffused layer. In the case of Armco iron, growth of the phases was not uniform. However, in the case of carbon (Edited author abstract) 7 Refs. In Japanese.

12/3,AB/2 (Item 2 from file: 8)
DIALOG(R)File 8:Ei Compendex(R)

00104155
E.I. Monthly No: EI70X148648
Title: Fine aluminum transistor lead wires.
Author: ONO, K.; NISHIHATA, M.; KOBAYASHI, S.
Source: Tokyo. Elec Communication Laboratory-Rev v 17 n 9 Sept 1969 p 974-88
Publication Year: 1969
Language: ENGLISH
Abstract: Experiment was carried out for the production of aluminum fine wire for transistor lead by copper clad method and for studying its mechanical properties. The aluminum wire produced has a tensile strength of 12 to 13 kg/mm, its Vickers hardness was about 33 and its qjrdness was uniformly distributed over the whole. Desirable time for annealing process of the copper clad aluminum wire should be less than 1 hr, at 250 C or less than 1/2 hr, at 300 C when the rate of cold drawing was above 80%. Intermetallic compound was formed on the boundary layer by heating for more than 2 hr at 250 C or more than 1 hr, at 300 C and its hardness was higher than 500 **Vickers hard714** EI 70 SEMICONDUCTOR DEVICES Bounding

Wires Formation of Al- Au intermetallic compounds and resistance increase for ultrasonic Al wire bonding; M. KASHIWABARA, S. HATTORI; Tokyo. Elec Communication Laboratory- Rev v 17 n 9 Sept 1969 p 1001- 13; Abnormal resistance increase related with Al- Au intermetallic compounds in the interconnection of semiconductor devices using Al wire ultrasonic bonding has been observed. The following results are obtained, together with understanding of the formation of intermetallic com%pounds. Abnormal increase in resistance caused by the connection of the cracks leads to the breaking of electrical circuit. The phenomenon mentioned above varies markedly with the ratio of actual contact width of a bonded part to thickness of plated Au film, and is never found if this ratio is over 4 at normal storage temperature less than 350 C.

12/3,AB/3 (Item 1 from file: 94)
DIALOG(R)File 94:JICST-EPlus

04193259 JICST ACCESSION NUMBER: 99A0730533 FILE SEGMENT: JICST-E
Effect of Cu Content on Mechanical Strength of Improved 5052 Al-Mg Alloys Cu-Added by Electron Beam Process.
SAKAMOTO YOSHINORI (1); KAJITA NOBUHIKO (1); SANUKI SUMIKO (1); NOTOYA HISAKIMI (1); ARAI KOICHI (1); TERABAYASHI MASATAKE (2); MAE TAKEHIKO (2)
(1) Toyama Univ., Fac. of Eng.; (2) Toyama Nat. Coll. of Technol.
Nippon Kinzoku Gakkaishi(Journal of the Japan Institute of Metals), 1999, VOL.63,NO.7, PAGE.924-930, FIG.12, TBL.2, REF.14
JOURNAL NUMBER: G0023AAV ISSN NO: 0021-4876 CODEN: NIKGA
UNIVERSAL DECIMAL CLASSIFICATION: 669.017:539.4.01
LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Journal
ARTICLE TYPE: Original paper
MEDIA TYPE: Printed Publication
ABSTRACT: The optimum Cu content in the improved 5052 alloy with Cu addition by the electron beam welding process was investigated by the measurement of tensile tests to determine the mechanical strength of the improved 5052 alloys and the interface between the substrate and the improved area of the alloys. The X-ray diffraction or EDAX analysis of the precipitates, the observation of scanning electron micrographs of the samples with or without improved treatment and the fracture surface after tensile tests were also performed. The main results obtained are summarized as follows: (1) The grain size of Al(.ALPHA.) phase in the improved 5052 alloys was below 10.MU.m in diameter. The Al(.ALPHA.)+Al2Cu eutectic structure crystallized around the Al(.ALPHA.) phase, and its surface area ratio of the eutectic structure increased with increasing Cu content in the improved alloys. However, the surface area ratio of the eutectic structure was almost constant at the Cu content higher than 15mass%. On the contrary, the surface area ratio of the large size of the Al2Cu intermetallic compound increased with increasing Cu addition at the Cu content higher than 15mass%. (2) The **Vickers hardnes** of the improved 5052 alloys increased with increasing Cu content in the 5052 alloy. The mechanical properties such as U.T.S. of the improved alloys increased with increaasing Cu addition at the Cu content below 10mass%. The values of U.T.S. were almost constant at the Cu content from 10 to 15mass%. However, the mechanical strength of the improved 5052 alloys was reduced to the Cu content higher than 15mass%. The mechanical strength of the interface between the substrate and the improved area was also reduced with increasing Cu content in the range higher than 15mass%. (author abst.)

17/3,AB/1 (Item 1 from file: 2)
DIALOG(R)File 2:INSPEC

7066921 INSPEC Abstract Number: A2001-22-8280T-015, B2001-11-7230L-048
Title: Development of oxygen-permeable ceramic membranes for NO/sub x/-sensors
Author(s): Schulte, T.; Waser, R.; Romer, E.W.J.; Bouwmeester, H.J.M.; Nigge, U.; Wiemhofer, H.-D.
Author Affiliation: Corp. Res. & Dev., Robert Bosch GmbH, Stuttgart, Germany
Journal: Journal of the European Ceramic Society Conference Title: J. Eur. Ceram. Soc. (UK) vol.21, no.10-11 p.1971-5
Publisher: Elsevier,
Publication Date: 2001 Country of Publication: UK
CODEN: JECSER ISSN: 0955-2219
SICI: 0955-2219(2001)21:10/11L.1971:DOPC;1-N
Material Identity Number: N568-2001-009
U.S. Copyright Clearance Center Code: 0955-2219/2001/$20.00
Conference Title: Electroceramics VII'00
Conference Sponsor: Ministr. Sci. & Technol. Republic Slovenia; Eur. Commission, Brussels; AIXtron AG, Aachen; et al
Conference Date: 3-6 Sept. 2000 Conference Location: Portoroz, Slovenia
Language: English
Abstract: Several mixed ionic-electronic conductors such as Gd/sub 1-x/Ca/sub x/CoO/sub 3-d/ (GCC) and La/sub 1-x/Sr/sub x/Co/sub 1-y/Cu/sub y/O/sub 3-d/ as well as **composite materials** like Gd/sub 1-x/Ca/sub x/CoO/sub 3-d//Ce/sub 1-x/Gd/sub x/O/sub 2-d/ (GCCCGO) have been investigated with respect to their use as highly selective membranes within a new amperometric sensor system. Materials characterisation was carried out concerning surface reactions of the membranes, **thermal expansion** , and electronic as well as oxygen permeation properties. Taking advantage of the effective medium theory, the optimum component-ratio for the composite ceramic GCCCGO with respect to permeation behaviour has been predicted. Based on experimental and modelling data, the overall performance of a system using a GCCCGO membrane has been determined.
Subfile: A B

17/3,AB/2 (Item 1 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

04412210 Genuine Article#: TB583 Number of References: 39
Title: ELASTIC ANOMALIES IN Y-123/AG **COMPOSITE-MATERIALS** (Abstract Available)
Author(s): REDDY PV; SEKHER S; MULAY VN
Corporate Source: OSMANIA UNIV,DEPT PHYS/HYDERABAD 500007/ANDHRA PRADESH/INDIA/; INDIAN INST CHEM TECHNOL/HYDERABAD 500007/ANDHRA PRADESH/INDIA/
Journal: INTERNATIONAL JOURNAL OF MODERN PHYSICS B, 1995, V9, N23 (OCT 20) , P3053-3068
ISSN: 0217-9792
Language: ENGLISH Document Type: ARTICLE
Abstract: With a view to understand the influence of Ag on the

microstructure of Y-123 samples, and hence its microstructural impact on the low temperature elastic behavior, a series of Y-123/Ag superconducting **composite materials** have been prepared by the Sol-Gel method. After characterization, ultrasonic velocity and attenuation measurements were undertaken over a temperature range of 80-300 K, using the pulse transmission technique. In contrast to the normal solids, the ultrasonic velocity of all the samples of the present investigation, in the temperature range of 80-300 K, are found to exhibit elastic anomalies signaling the presence of lattice instabilities. It has also been observed that most of the samples are found to exhibit longitudinal attenuation peaks at temperatures 250 K, 170 K and 100 K. A qualitative explanation for the observed phenomena of both lattice softening and attenuation is given on the basis of microstructure and relaxation.

17/3,AB/3 (Item 1 from file: 94)
DIALOG(R)File 94:JICST-EPlus

05007276 JICST ACCESSION NUMBER: 02A0022315 FILE SEGMENT: JICST-E
Noble High Thermal Conductivity, Low **Thermal Expansion** Cu-Cu2O Composite Base Plate Technology for Power Module Application.
SAITO RYUICHI (1); KONDO YASUO (1); OKAMOTO KAZUTAKA (1); KOIKE YOSHIHIKO (1); ABE TERUYOSHI (1); SUZUMURA TAKASHI (2)
(1) Hitachi, Ltd.; (2) Hitachi Cable, Ltd.
Denki Gakkai Denshi Debaisu Kenkyukai Shiryo, 2001, VOL.EDD-01,NO.76-88, PAGE.61-64, FIG.7, TBL.2, REF.4
JOURNAL NUMBER: Z0910AAZ
UNIVERSAL DECIMAL CLASSIFICATION: 621.315.5
LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Conference Proceeding
ARTICLE TYPE: Original paper
MEDIA TYPE: Printed Publication
ABSTRACT: Noble high thermal conductivity and low **thermal expansion** Cu-Cu2O composite base plate was developed and successfully applied to power modules. Metal matrix composite consists of Cu and **Cu oxide** was demonstrated to show excellent combination of thermal conductivity and **thermal expansion**. This noble Cu-Cu2O base plate was applied to power module, and high reliability and high thermal conductivity of the module were confirmed. Anisotropic thermal property of Cu-Cu2O base plate by controlling the microstructure of composite was also demonstrated. (author abst.)

17/3,AB/4 (Item 2 from file: 94)
DIALOG(R)File 94:JICST-EPlus

01586597 JICST ACCESSION NUMBER: 92A0658770 FILE SEGMENT: JICST-E
Infrared Radiation Characteristics of Sintered Bodies Prepared from Aluminum Titanate, Clay, and Transition Metal Oxides.
SUGIYAMA TOYOHIKO (1); HORIUCHI TATSURO (1); TAKASHIMA HIROO (1)
(1) Gov. Industrial Res. Inst., Nagoya
Nagoya Kogyo Gijutsu Shikenjo Hokoku(Reports of the Government Industrial Research Institute, Nagoya), 1992, VOL.41,NO.1, PAGE.24-30, FIG.5, TBL.1, REF.6
JOURNAL NUMBER: F0514AAV ISSN NO: 0027-7614 CODEN: NAGHA
UNIVERSAL DECIMAL CLASSIFICATION: 666.3/.7+

LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Journal
ARTICLE TYPE: Original paper
MEDIA TYPE: Printed Publication
ABSTRACT: Infrared radiation was studied for sintered bodies prepared from aluminum titanate (Al2TiO5), clay, and transition metal oxide(s). The addition of Mn2O3 to an Al2TiO5-clay mixture followed by sintering at 1000.DEG.C. resulted in a significant increase in the infrared spectral emittance, although sintering at higher temperatures brought about the decomposition of a considerable part of Al2TiO5 accompanying the decrease in the spectral emittance. The increase in the spectral emittance, though less pronounced, was also observed through the addition of Fe2O3. Performance was further improved by adding mixed transition metal oxides:the coexistence of Fe2O3 resulted in the enhancement of thermal stability of the body involving Mn2O3 and the coexistence of Mn2O3 **CuO**, and CoO resulted in the increase in the infrared spectral emittance of the body involving Fe2O3. The present study revealed that the sintered body with high performance in the infrared radiation could be obtained by adding transition metal oxides with appropriate combination. (author abst.)

17/3,AB/5 (Item 1 from file: 144)
DIALOG(R)File 144:Pascal

13603110 PASCAL No.: 98-0307988
In-situ high temperature X-ray diffraction study of Cu/Al SUB 2 O SUB 3 interface reactions
FUJIMURA T; TANAKA S I
Tanaka Solid Junction Project, Japan Science and Technology Corporation, 1-1-1 Fukuuraa, Kanazawa-ku, Yokohama 236, Japan
Journal: Acta materialia, 1998, 46 (9) 3057-3061
Language: English
In-situ experiments on the Cu/Al SUB 2 O SUB 3 interface reaction were carried out with a high temperature X-ray diffractometer capable of measuring the X-ray diffraction pattern in 1-2 s using an imaging plate. The kinetic formation processes of the interface reaction layer were measured by short-period exposure experiments with a high temperature X-ray diffractometer. CuAlO SUB 2 was formed at the Cu/Al SUB 2 O SUB 3 interface from 1411 to 1467 K in air. The formation of CuAlO SUB 2 obeyed the parabolic rate law. The value of the activation energy suggests that the diffusion of O (included in Cu SUB 2 O) through CuAlO SUB 2 controls the rate of formation. The results of **thermal expansion** coefficient measurements suggest that when a sample is cooled to room temperature. the magnitude of stress on Al SUB 2 O SUB 3 caused by CuAlO SUB 2 and **CuO** is smaller than that caused by Cu SUB 2 O.

17/3,AB/6 (Item 2 from file: 144)
DIALOG(R)File 144:Pascal

12830301 PASCAL No.: 97-0049402
Formation of spinel (MgAl SUB 2 O SUB 4), MgO and pure Cu particles in Al-2Mg alloy-**CuO** particle composites
MAITY P C; CHAKRABORTY P N; PANIGRAHI S C
National Institute of Foundry and Forge Technology, Hatia, Ranchi 834 003

, India; Metallurgical Engineering Department, Indian Institute of Technology, Kharagpur 721 302, India

Journal: Journal of materials science, 1996, 31 (23) 6377-6382
Language: English

CuO particles were introduced into liquid Al-2Mg alloy by the vortex method to prepare an Al alloy-MgAl SUB 2 O SUB 4 in situ particle composite, by reaction between **CuO** particles and the Al-2Mg alloy melt. Pure Cu, MgAl SUB 2 O SUB 4 and MgO particles were detected in the particles extracted from the composites. DTA study showed partial dissolution of Cu in the matrix. Microhardness and hardness of the composites are higher than those of the base alloy. Both microhardness and hardness are higher for the Al-2Mg-2CuO composite than those of the Al-2Mg-5CuO composite. The hardness of the Al-2Mg-2CuO composite is remarkably high. The increase in microhardness has been attributed to the solid solution hardening effect with Cu as well as to the difference in CTE between the Al matrix and the particles. On the other hand, the improvement in hardness resulted from both solid solution hardening as well as the presence of hard particles such as MgAl SUB 2 O SUB 4 and MgO.

17/3,AB/7 (Item 3 from file: 144)
DIALOG(R)File 144:Pascal

12770780 PASCAL No.: 96-0486441

Properties of cathodic arc deposited high-temperature superconducting composite thin films on Ag substrates

CHAE M S; SIMNAD M T; MAPLE M B; ANDERS S; ANDERS A; BROWN I G

Institute for Pure and Applied Physical Sciences, University of California, San Diego, La Jolla, CA 92093-0360, United States; Materials Science Program, School of Engineering, University of California, San Diego , La Jolla, CA 92093-0317, United States; Lawrence Berkeley National Laboratory, University of California, Berkeley, CA 94720, United States

Journal: Physica. C. Superconductivity, 1996, 270 (1-2) 173-179
Language: English Summary Language: English

Copyright (c) 1996 Elsevier Science B.V. All rights reserved. High temperature superconducting composite thin films on Ag substrates were prepared by cathodic arc deposition of alloy precursors. The deposition technique employed a cathode comprised of a precursor alloy for the vacuum arc plasma source. The precursor alloy was prepared by multiple arc-melting of mixed metallic constituents of the high-temperature superconducting material Bi SUB 2 Sr SUB 2 CaCu SUB 2 O SUB y (Bi2212) and 50 wt.% of Ag. The presence of silver in the precursor alloy film was expected to allow accommodation of the lattice and **thermal expansion** mismatch between the oxidized film and the silver substrate. The as-deposited film could be formed to practically any desirable shape before being subjected to heat treatments. Following deposition, controlled oxidation of the precursor alloy thin film on the Ag substrate was performed to produce the superconducting composite on the silver substrate. After the heat treatment, the composite film consisted of Bi2212 highly c-axis oriented normal to the Ag substrate.

17/3,AB/8 (Item 4 from file: 144)
DIALOG(R)File 144:Pascal

12169296 PASCAL No.: 95-0379874
Study of **thermal expansion** of Bi-2212/Ag tape conductors using ESEM
BELENLI I; EBRAHIMI M; HASCICEK Y S
National high magnetic field lab., Tallahassee FL 32306, USA
Journal: Physica. C. Superconductivity, 1995, 247 (3-4) 371-375
Language: English

Thermal expansion of Bi-2212 tapes dip coated on silver substrate was studied between room temperature and similar 1000 K using an Electroscan ESEM equipped with a hot stage. We showed that this can be a simple alternative technique when other conventional techniques have experimental difficulties because of the sample geometry and size. Extensive shrinkage (more than 5%) was observed upon first heating of the green Bi-2212 which was removed from the silver substrate. The green composite tape more or less followed the **thermal expansion** of silver tape on which it was coated. **Thermal expansion** of fully **heat**-treated Bi-2212 /Ag superconducting composite tape is similar to that of silver tape up to about 650 K. Between similar 650 K and similar 1000 K the composite exhibits less expansion

17/3,AB/9 (Item 5 from file: 144)
DIALOG(R)File 144:Pascal

11349052 PASCAL No.: 94-0171440
Improvement of strain endurance of critical current of silver-sheathed superconducting tapes by reducing volume fraction of Bi(Pb)-Sr-Ca-**Cu**-O oxide core
OCHIAI S; HAYASHI K; OSAMURA K
Kyoto univ., fac. eng., mesoscopic materials res. cent., Kyoto 606, Japan
Journal: Cryogenics : (Guildford), 1993, 33 (10) 976-979
Language: English

20/3,AB/1 (Item 1 from file: 8)
DIALOG(R)File 8:Ei Compendex(R)

03000211
E.I. Monthly No: EIM9012-050120
Title: Thermal ratchet in graphite fiber/nickel matrix composites.
Author: Sara, R. V.
Corporate Source: UCAR Carbon Co Inc, Parma, OH, USA
Conference Title: Proceedings of the 77th AESF Annual Technical Conference Part 2 (of 2)
Conference Location: Boston, MA, USA Conference Date: 19900709
E.I. Conference No.: 13534
Source: Proceedings of the AESF Annual Technical Conference. Publ by American Electroplaters & Surface Finishers Soc Inc, Orlando, FL, USA. p 1331-1339
Publication Year: 1990
CODEN: PATCEY
Language: English
Abstract: This work is intended to illustrate the special importance which the fiber/matrix interface has in a **composite material**. Graphite fiber/nickel matrix composites were made by first electroplating carbon fibers providing continuous, flexible, ribbon-like yarn free of twist. The ribbons were then hot pressed into dense uniaxial composites for thermal fatigue evaluations. When composites have marked differences in the **thermal expansion** coefficients for the metal matrix and the reinforcing fibers, severe and irreversible property degradation and porosity development can occur during thermal cycling. A phenomenon - known as 'ratcheting' - is illustrated with experimental data showing the extensive matrix cracking and irreversible expansion of the composite occurring perpendicularly to the reinforcing fibers. The mechanism of the phenomenon and methods for overcoming the problem are discussed. (Author abstract) 10 Refs.

20/3,AB/2 (Item 1 from file: 94)
DIALOG(R)File 94:JICST-EPlus

04045157 JICST ACCESSION NUMBER: 99A0273083 FILE SEGMENT: JICST-E
New carbon materials and carbon fibers whose application is expanding. Application examples of carbon fibers. Carbon matrix metal composites.
TSUSHIMA EIKI (1); KAWAMURA NORIAKI (1)
(1) Sentanzairyo
Kogyo Zairyo(Engineering Materials), 1999, VOL.47,NO.3, PAGE.65-68, FIG.3, TBL.1, REF.5
JOURNAL NUMBER: F0172AAZ ISSN NO: 0452-2834 CODEN: KZAIA
UNIVERSAL DECIMAL CLASSIFICATION: 677:001.89 661.66 669.018.9
LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Journal
ARTICLE TYPE: Commentary
MEDIA TYPE: Printed Publication
ABSTRACT: Carbon matrix metal composites are unidirectional carbon fiber reinforced carbon composites into the remained bubbles of which molten metal is impregnated, and have the same strength as that of metal, while heat resistance and thermal conductivity are kept at the same level as those of carbon materials. After explaining the production methods, texture, specific gravity, tensile strength and bending

strength of the composites into which aluminum is impregnated, this paper introduces high power semiconductor modules in which fins made of aluminum-impregnated carbon are used, and describes the prospects to the future.

20/3,AB/3 (Item 2 from file: 94)
DIALOG(R)File 94:JICST-EPlus

01884188 JICST ACCESSION NUMBER: 93A0524647 FILE SEGMENT: JICST-E
Fluidity of Al2O3 or SiC particle dispersion type aluminum alloy.
TERAMOTO SHOSHIRO (1)
(1) Nagasakikenkogiken
Nippon Imono Kyokai Zenkoku Koen Taikai Koen Gaiyoshu, 1993, VOL.122nd, PAGE.2, REF.1
JOURNAL NUMBER: Y0031AAC
UNIVERSAL DECIMAL CLASSIFICATION: 669:621.746.6 669-492
LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Conference Proceeding
ARTICLE TYPE: Short Communication
MEDIA TYPE: Printed Publication

20/3,AB/4 (Item 3 from file: 94)
DIALOG(R)File 94:JICST-EPlus

01679461 JICST ACCESSION NUMBER: 93A0138111 FILE SEGMENT: JICST-E
NTC Effect in Conductor/Polymer Composite.
OTA T (1); YAMAI I (1)
(1) Nagoya Inst. Technology, Tajimi-shi
Nagoya Kogyo Daigaku Kogakubu Fuzoku Seramikkusu Kenkyu Shisetsu Nenpo(Annual Report of the Ceramics Research Laboratory, Nagoya Institute of Technology), 1992, VOL.2, PAGE.51-53, FIG.6, REF.7
JOURNAL NUMBER: Z0964BAD ISSN NO: 0917-8740
UNIVERSAL DECIMAL CLASSIFICATION: 678.01:53
LANGUAGE: English COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Journal
ARTICLE TYPE: Original paper
MEDIA TYPE: Printed Publication
ABSTRACT: A negative temperature coefficient(NTC) of resistance was found in a conductor/polymer composite. The **composite material** was composed of randomly dispersed conducting **Ni-plated** polystyrene particles and epoxy matrix. The composites containing 50 to 60vol% **Ni-plated** polystyrene exhibited significant NTC effects of about 2 orders of magnitude in the temperature range of 50.DEG. to 150.DEG.C.. It was assumed that this NTC effect resulted from larger **thermal expansion** of conducting filler as compared with matrix. (author abst.)

20/3,AB/5 (Item 4 from file: 94)
DIALOG(R)File 94:JICST-EPlus

00310721 JICST ACCESSION NUMBER: 86A0483961 FILE SEGMENT: JICST-E
Fabrication and estimate of carbon fiber reinfoced metals.
TSUCHITORI ISAO (1); NITTA AKIRA (1); HARA NOBUHIKO (1)

(1) Hiroshima Prefect. Industrial Res. Inst., West
Hiroshima Kenritsu Seibu Kogyo Gijutsu Senta Hokoku(Bulletin of the Industrial Research Institute, Hiroshima Prefecture, West), 1986, NO.29, PAGE.62-65, FIG.14, REF.6
JOURNAL NUMBER: F0831ABO ISSN NO: 0385-8669
UNIVERSAL DECIMAL CLASSIFICATION: 621.763 669.017:539.4.01 669-419.8
LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Journal
ARTICLE TYPE: Original paper
MEDIA TYPE: Printed Publication
ABSTRACT: Carbon fiber composites were fabricated by vacuum hot press using Ni or Cu electrodeposited fiber. CF/Ni composite was investigated their fabrication condition and CF/Cu composite was investigated their materials properties. The results were as follows: (1) The tensile strength of CF/Ni composite(Vf=55%) attained to 82kgf/mm2 by selecting condition (800.DEG.C), and that of CF/Cu was 95kgf/mm2. (2) High temperature tensile strength of CF/Cu composite keeped room temperature's strength up to 300.DEG.C, then more high temperature, that strength was decreased. (3) Impact sharpy test of CF/Cu composite could not be estimated correctly. (4) **Thermal expansion** coefficient of CF/Cu composite could be controlled within narrow range, and their **thermal expansion** increased up to 300.DEG.C, then more high temperature, stragnated or decreased.(author abst.)

20/3,AB/6 (Item 5 from file: 94)
DIALOG(R)File 94:JICST-EPlus

00288074 JICST ACCESSION NUMBER: 86A0411203 FILE SEGMENT: JICST-E
Celmet reinforced aluminum alloy casting.
NISHIMOTO MITSUO (1); SAWADA KAZUO (1); OKUBO NAOYUKI (1)
(1) Sumitomo Electric Industries Ltd.
Keikinzoku Gakkai Taikai Koen Gaiyo, 1985, VOL.68th, PAGE.7-8, FIG.3, TBL.5
JOURNAL NUMBER: Y0775AAX
UNIVERSAL DECIMAL CLASSIFICATION: 669-14 669.018.9
LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Conference Proceeding
ARTICLE TYPE: Short Communication
MEDIA TYPE: Printed Publication

26/3,AB/1 (Item 1 from file: 94)
DIALOG(R)File 94:JICST-EPlus

04673146 JICST ACCESSION NUMBER: 00A0847101 FILE SEGMENT: JICST-E
Production and mechanical properties of amorphous alloy wires.
KIMURA HISAMICHI (1); INOUE AKIHISA (1); SASAMORI KEN'ICHIRO (1); WAKU YOSHIHARU (2)
(1) Inst. for Mater. Res., Tohoku Univ.; (2) Japan Ultra-High Temperature Materials Res. Inst., JPN
Nihon Kikai Gakkai Nenji Taikai Koen Ronbunshu, 2000, VOL.2000,NO.Vol.3, PAGE.375-379, FIG.5, REF.4
JOURNAL NUMBER: X0587BAW
UNIVERSAL DECIMAL CLASSIFICATION: 539.213:546.3 669.2/.8.05
LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Conference Proceeding
ARTICLE TYPE: Short Communication
MEDIA TYPE: Printed Publication
ABSTRACT: Al85Ni10Ce5, Ti40Zr10Cu50 and Zr65Al10Cu15Ni10 amorphous wires were produced by a newly designed method, i.e., melt extraction using a high frequency and an arc furnace. The wires have a circular **cross section** and a smooth peripheral surface, but small flaws are observed on the surface. The structure of the amorphous alloy wires is nearly the same as that of the melt-spun amorphous ribbons. The tensile strength and elongation are 930MPa and 1.5%, respectively, for the Al85Ni10Ce5 wire and 2000MPa and 2.0%, respectively, for the Ti40Zr10Cu50 wire. The Zr65Al10Cu15Ni10 wire has a large supercooled liquid region of 95K, the coefficient of **thermal expansion** of 9.2*10-6K-1, tensile fracture strength of 1590MPa and fracture elongation of 2.2%. (author abst.)

26/3,AB/2 (Item 1 from file: 144)
DIALOG(R)File 144:Pascal

12904859 PASCAL No.: 97-0170799
The growth of multi-star CVD beta -SiC and SiC/TiC composites
LIN T T; HON M H
Department of Materials Science and Engineering, National Cheng Kung University, Tainan, 70101, Taiwan
Journal: Nippon seramikkusu kyokai gakujutsu ronbunshi, 1996, 104 (3) 174-178
Language: English
The multi-star beta -SiC and SiC/TiC composites have been deposited by CVD method on graphite substrate. The precursors, SiCl SUB 4 , TiCl SUB 4 and C SUB 3 H SUB 8 were used as silicon, titanium and carbon sources, respectively, and hydrogen as a carrier gas for deposition. The morphology of surface and polished **cross section** for the SiC and SiC/TiC composite deposited was observed by SEM. The crystal orientations and microstructrure were analyzed by XRD and TEM. The growth propagation of the multi-star beta -SiC and the SiC/TiC composites is attributed to the twin-plane-reentrant-edge mechanism. The (220) is an intensely preferred orientation as the twin axis of interpenetration twin configuration. The interface of SiC/TiC is severely strained as found in TEM image and dislocations are generated in the TiC phases owing to the mismatch of coefficient of **thermal expansion**.

30/3,AB/1 (Item 1 from file: 94)
DIALOG(R)File 94:JICST-EPlus

04832211 JICST ACCESSION NUMBER: 01A0247257 FILE SEGMENT: JICST-E
X-Ray Evaluation of Residual Stresses during Heat-Treating of Continuous SiC Fiber-Reinforced 6061Al Alloy Composite.
IKEUCHI YASUKAZU (1); MATSUEI TATSUYA (1); HANABUSA TAKAO (2)
(1) Niihama Natl. Coll. of Technol.; (2) Univ. of Tokushima, Fac. of Eng.
Zairyo(Journal of the Society of Materials Science, Japan), 2001, VOL.50,NO.1, PAGE.76-82, FIG.11, TBL.2, REF.14
JOURNAL NUMBER: F0385ABI ISSN NO: 0514-5163 CODEN: ZARYA
UNIVERSAL DECIMAL CLASSIFICATION: 669-419.8 620.179:669
LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Journal
ARTICLE TYPE: Original paper
MEDIA TYPE: Printed Publication
ABSTRACT: Residual stresses arise in fiber-reinforced **metal** matrix composites due to the **thermal expansion** mismatch between the matrix and fibers after cooling the composites from elevated temperatures. The residual stresses in a 6061Al alloy unidirectionally reinforced with 140-.MU.m diameter SiC fibers were measured during thermal cycling, and after heat-treating, of the composite. While relative changes of the fiber residual stress were estimated from measurements of the change in length of the heat-treated composite, matrix residual stresses were measured by X-ray diffraction. The X-ray triaxial stress analysis, where the measured value of a stress-free interplanar spacing d0 was discussed to be reliable, showed that a stress state in the matrix surface layer sampled by the X-ray was biaxial and that the longitudinal residual stress parallel to the fibers was the maximum principal stress. It was found that the residual stresses were independent of cooling rates of the composite and that changes of the longitudinal residual stress in the matrix and in the fibers balanced each other in the heat-treated composite. The X-ray biaxial stress measurements during thermal cycling between room and aging temperature of the aged composite revealed that the matrix tensile residual stresses decreased linearly with increasing temperature. The reduction could be well described by using an elastic concentric cylinder model. (author abst.)

30/3,AB/2 (Item 2 from file: 94)
DIALOG(R)File 94:JICST-EPlus

04045402 JICST ACCESSION NUMBER: 99A0286552 FILE SEGMENT: JICST-E
X-Ray Triaxial Evaluation of Thermal Residual Stress in Continuos Alumina Fiber Reinforced Al-5%**Cu** Composite.
IKEUCHI YASUKAZU (1); MATSUE TATSUYA (1); SOGA TAKASHI (2)
(1) Niihama Natl. Coll. of Technol.; (2) Taiyosekiyu
Niihama Kogyo Koto Senmon Gakko Kiyo(Memoirs of Niihama National College Technology), 1999, VOL.35, PAGE.78-86, FIG.9, REF.28
JOURNAL NUMBER: G0175ABS ISSN NO: 1342-6540
UNIVERSAL DECIMAL CLASSIFICATION: 539.3:669 669-419.8
LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Journal
ARTICLE TYPE: Original paper
MEDIA TYPE: Printed Publication

ABSTRACT: When a fiber-reinforced **metal** matrix composite is cooled down to room temperature from the fabrication or annealing temperature, residual stresses are induced in the composite due to the difference in the coefficient of **thermal expansion** between the matrix and fibers. An X-ray diffraction technique was used to measure thermal residual stresses in the matrix of an Al-5%**Cu** alloy reinforced with 17-.MU.m diameter .GAMMA.-Alumina fibers. For the composites of this class, it was confirmed that the triaxiality of residual stresses has to be considered in the penetration depth of the X-ray used. The triaxial state of the matrix thermal residual stress was determined by using the stress-free interplanar spacing, d0, measured for the composite filings. The reliability of the d0 value was also discussed. In the matrix of the composite annealed at 600K, a tensile residual stress state was observed. On the measurement after cooling the annealed composite to liquid nitrogen temperature, the matrix showed a compressive stress state. In both of the matrix stress states, the longitudinal residual stress parallel to the fibers was the maximum principal stress and the transverse residual stress normal to the fibers was found to be about 40% of the longitudinal residual stress in magnitude. The experimental results agreed well with the prediction based on an elastic concentric cylinder model. (author abst.)

30/3,AB/3 (Item 3 from file: 94)
DIALOG(R)File 94:JICST-EPlus

03636567 JICST ACCESSION NUMBER: 98A0626626 FILE SEGMENT: JICST-E
Development of **Metal**-Impregnated Carbon Materials by Using HIP.
SOGABE T (1); ONISHI Y (1); INOUE H (1); OKADA O (1); MATSUMOTO T (1)
(1) Toyo Tanso Co., Ltd., Kagawa, JPN
Koatsuryoku no Kagaku to Gijutsu(Review of High Pressure Science and Technology), 1998, VOL.7, PAGE.1072-1074, FIG.4, TBL.4, REF.9
JOURNAL NUMBER: L1386AAJ ISSN NO: 0917-639X CODEN: KKGIE
UNIVERSAL DECIMAL CLASSIFICATION: 661.66 629.4.02/.03 621.89 621.3.066
LANGUAGE: English COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Journal
ARTICLE TYPE: Original paper
MEDIA TYPE: Printed Publication
ABSTRACT: For the development of new advanced carbon materials, carbon/ **metal** composites were prepared by using HIP for impregnation. Different metals, Sb,Al,Ag and **Cu** were impregnated into open pores of carbon materials at a temperature, 100-150.DEG.C. higher than the melting points of these impregnants, under a pressure of 10-12MPa. Sb-impregnated graphite exhibited gas impreviousness and good performance for sliding component or low friction coefficient and high wear resistance. Al-impregnated carbon material has a high mechanical strength and elastic modulus with moderate **thermal expansion** coefficient. **Cu**-impregnated carbon materials which has excellent properties for slider for pantograph of electric car has been developed. (author abst.)

30/3,AB/4 (Item 4 from file: 94)
DIALOG(R)File 94:JICST-EPlus

03620002 JICST ACCESSION NUMBER: 98A0604880 FILE SEGMENT: JICST-E

Superconducting Properties and Uniaxial Strain Characteristics of Nb3Sn Fiber-Reinforced Superconductors with Tantalum Reinforcement Fibers.
ARAI KAZUAKI (1); UMEDA MASAICHI (1); AGATSUMA KO (1); TATEISHI HIROSHI (1)
(1) Electrotech. Lab., Agency of Ind. Sci. and Technol.
Denki Gakkai Ronbunshi. A(Transactions of the Institute of Electrical Engineers of Japan. A), 1998, VOL.118-A,NO.5, PAGE.447-452, FIG.7, TBL.1, REF.20
JOURNAL NUMBER: S0808AAA   ISSN NO: 0385-4205
UNIVERSAL DECIMAL CLASSIFICATION: 537.312.62:621.315.55
LANGUAGE: Japanese   COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Journal
ARTICLE TYPE: Original paper
MEDIA TYPE: Printed Publication
ABSTRACT: We have been developing fiber-reinforced superconductors (FRS) for high-field and large-scale magnets. Tungsten fibers have been selected as the reinforcement fiber for FRS so far because tungsten has the highest elastic modulus of approximately 400 GPa which can minimize the strain from electromagnetic force. The preparation process of FRS consists of sputtering deposition and heat treatment because it may be difficult to apply drawing methods to materials of high-elastic modulus such as tungsten. Tantalum has high elastic modulus of 178 GPa and its **thermal expansion** coefficient that is closer to that of Nb3Sn than tungsten's, which means prestain in Nb3Sn in FRS is reduced by adopting tantalum fibers. Tantalum has been used as barriers between bronze and **copper** in conventional Nb3Sn superconductors which are usually prepared with drawing process despite of the tatalum's high elastic modulus. That implies drawing process may be applied to prepare FRS with tantalum reinforcement fibers. In this paper, FRS using tantalum fibers prepared with supttering process are described with making comparison with FRS of tungsten to clarify the basic properties of FRS using tantalum fibers. Depth profiles in Nb3Sn layer in FRS were measured to examime reaction between superconducting layers and reinforcement fibers. Superconducting properties including strain and stress characteristics were shown. Those data will contribute to design of FRS using tantalum reimforcement fibers with adopts the drawing processes. (author abst.)

30/3,AB/5   (Item 5 from file: 94)
DIALOG(R)File 94:JICST-EPlus

03188488   JICST ACCESSION NUMBER: 97A0241747   FILE SEGMENT: JICST-E
Research on element forming techniques. Research on heat resistant element forming techniques by fiber tilt layout. (Science and Technology Agency, Research and Development Bureau S).
SODA YOSHIHO (1); HISATE YUKINORI (1)
(1) Nippon Oil Co., Ltd., Central Tech. Res. Lab.
Keisha Kozo Keisei ni yoru Enerugi Henkan Zairyo no Kaihatsu ni kansuru Kenkyu, Dai1ki, Seika Hokokusho. Heisei 5,7 Nendo, 1997, PAGE.348-367, FIG.22, TBL.3, REF.1
JOURNAL NUMBER: N19970373Y
UNIVERSAL DECIMAL CLASSIFICATION: 621.315.5
LANGUAGE: Japanese   COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Journal
ARTICLE TYPE: Original paper
MEDIA TYPE: Printed Publication
ABSTRACT: Use of fiber reinforced **metal** is examined for temperature control between members and relaxation of thermal stress in order to

integrate slope structure energy conversion elements and achieve high efficiency. Thus, thermophysical control technology by a fiber slope arrangement structure has been established. A solar light heat collection structure whose heat receiving part is cylindrical shape cavity using carbon fiber three-dimensional fabric is experimentally produced, effect of fiber slope arrangement for heat collection property is examined and advantage of a C/C composite is demonstrated.

30/3,AB/6 (Item 6 from file: 94)
DIALOG(R)File 94:JICST-EPlus

03021420 JICST ACCESSION NUMBER: 96A0946716 FILE SEGMENT: JICST-E
Thermal Residual Stresses in Continuous Fiber-Reinforced Aluminum Composites.
IKEUCHI YASUKAZU (1); HANABUSA TAKAO (2)
(1) Niihama Natl. Coll. of Technol.; (2) Univ. of Tokushima, Fac. of Eng.
Kyoto Daigaku Genshiro Jikkenjo Technical Report KURRI,TR(Technical Reports of the Research Reactor Institute, Kyoto University), 1996, NO.420, PAGE.48-58, FIG.26, TBL.2, REF.18
JOURNAL NUMBER: S0280AAG ISSN NO: 0287-9808
UNIVERSAL DECIMAL CLASSIFICATION: 669.017:539.4.01 669-419.8
LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Technical Report
ARTICLE TYPE: Original paper
MEDIA TYPE: Printed Publication
ABSTRACT: When a fiber-reinforced **metal** matrix composite is cooled down to room temperature from the fabrication or annealing temperature, residual stresses are induced in the composite because of the **thermal expansion** mismatch between matrix and fiber. The X-ray diffraction technique was used to measure thermal residual stresses in the matrix of two different composites, the first being a pure Al reinforced with 17-.MU.m diameter .GAMMA.-Al2O3 fibers and the second being a 6061Al reinforced with 140-.MU.m diameter SiCCVD fibers. The triaxial state of the matrix thermal residual stress in each composite was determined. In the matrix of each anncaled composite a tensile residual stress state was observed. On the measurement after cooling the annealed composite to liquid nitrogen temperature, the matrix showed a compressive stress state in each composite. In both of the matrix stress states, the longitudinal residual stress parallel to the fibers was the maximum principal stress. In the case of the .GAMMA.-Al2O3/Al composite with smaller diameter fibers, the stress measured normal to the surface was found to be about a half of the transverse residual stress. This can be due to the relaxation of the component of residual stress in the matrix near the surface layer. In order to better understand the thermally induced residual stress, the X-ray in situ measurements were carried out during heating and cooling of the composites. The matrix tensile residual stresses at room temperature decreased linearly with increasing measurement temperature. The experimental results agreed well with the prediction based on a simple clastic concentric cylinder model. (author abst.)

30/3,AB/7 (Item 7 from file: 94)
DIALOG(R)File 94:JICST-EPlus

02087077 JICST ACCESSION NUMBER: 94A0653744 FILE SEGMENT: JICST-E

Thermal fatigue, **thermal expansion** and mechanical
properties of pitch-based carbon fiber reinforced 7075 aluminum alloy.
IKUNO HAJIME (1); TOWATA SHIN'ICHI (1); AWANO YOJI (1); YAMADA SEN'ICHI (2)
(1) Toyota Cent. Res. & Dev. Lab., Inc.; (2) Kanto Gakuin Univ.
Keikinzoku(Journal of Japan Institute of Light Metals), 1994, VOL.44,NO.7,
PAGE.379-384, FIG.13, TBL.3, REF.9
JOURNAL NUMBER: F0772AAD ISSN NO: 0451-5994 CODEN: KEIKA
UNIVERSAL DECIMAL CLASSIFICATION: 669-419.8 669.017:539.4.01
LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Journal
ARTICLE TYPE: Original paper
MEDIA TYPE: Printed Publication
ABSTRACT: The composite which was prepared by squeeze casting process had a high Young's modulus (470 GPa) and a low coefficient of **thermal expansion** (0.4 *10-6 K-1) in the longitudinal direction. Thermal cycling between 300 and 620K caused residual expansion in the transverse direction and cracks in the interface between fibers and matrix. However, these damages were scarcely observed after thermal cycling either between 150 and 390 K or between 300 and 540 K. The residual expansion increased with the temperature difference of thermal cycling, namely, with increasing plastic strain of the matrix. These thermal fatigue damages were observed under the condition of thermal strain higher than 5 *10-3. This critical strain is much higher than 2 *10-3, which is the critical strain for the PAN-based carbon fiber composites. Therefore, it is considered that the pitch-based carbon fiber composite is superior in thermal fatigue resistance. The calculation on the basis of anisotropic properties of the pitch-based carbon fiber indicates that the interfacial stress is as low as a tenth of the bonding strength. (author abst.)

30/3,AB/8 (Item 8 from file: 94)
DIALOG(R)File 94:JICST-EPlus

01585611 JICST ACCESSION NUMBER: 92A0594661 FILE SEGMENT: JICST-E
X-ray thermal stress measurement of alumina fiber reinforced Al-5**%Cu**
alloy.
IKEUCHI YASUKAZU (1); HANABUSA TAKAO (2); FUJIWARA HARUO (2)
(1) Niihama National College of Technology; (2) Univ. of Tokushima, Faculty
of Engineering
Xsen Zairyo Kyodo ni kansuru Shinpojiumu Koen Ronbunshu(Proceedings of the
Symposium on X-Ray Studies on Mechanical Behavior of Materials), 1992,
VOL.28th, PAGE.177-181, FIG.9, REF.15
JOURNAL NUMBER: F0605BAN
UNIVERSAL DECIMAL CLASSIFICATION: 539.3:669 669-419.8
LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Conference Proceeding
ARTICLE TYPE: Original paper
MEDIA TYPE: Printed Publication

30/3,AB/9 (Item 9 from file: 94)
DIALOG(R)File 94:JICST-EPlus

01163462 JICST ACCESSION NUMBER: 90A0721254 FILE SEGMENT: JICST-E
Electronic circuit related products.
SUGIMOTO TOSHIO (1); NEMOTO YOSUI (1)

(1) Mitsubishi Petrochemical Co., Ltd.
Chemitopia, 1990, NO.7, PAGE.26-31, FIG.7, TBL.7, REF.3
JOURNAL NUMBER: L0437AAL
UNIVERSAL DECIMAL CLASSIFICATION: 671.315.616 621.315.5
LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Journal
ARTICLE TYPE: Commentary
MEDIA TYPE: Printed Publication

30/3,AB/10 (Item 10 from file: 94)
DIALOG(R)File 94:JICST-EPlus

00964335 JICST ACCESSION NUMBER: 90A0182049 FILE SEGMENT: JICST-E
Fabrication of **composite materials** consisting of aluminum borate whisker and aluminum alloys by molten **metal** forging process.
KITAMURA TAKAO (1); WADA HIDEO (1); SAKANE KOJI (1); KAMITAKA YUKINORI (2) ; HATA HAJIME (3)
(1) Gov. Industrial Res. Inst., Shikoku; (2) Kagawa Prefect. Industrial Technology Center; (3) Shikoku Chemicals Corp.
Keikinzoku Gakkai Taikai Koen Gaiyo, 1989, VOL.77th, PAGE.9-10, FIG.3, REF.1
JOURNAL NUMBER: Y0775AAX
UNIVERSAL DECIMAL CLASSIFICATION: 669:621.74.04 669-419.8
LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Conference Proceeding
ARTICLE TYPE: Short Communication
MEDIA TYPE: Printed Publication

30/3,AB/11 (Item 11 from file: 94)
DIALOG(R)File 94:JICST-EPlus

00963630 JICST ACCESSION NUMBER: 90A0158095 FILE SEGMENT: JICST-E
Development of aluminum powder alloys for resin injection molding dies.
SANO HIDEO (1); OKUBO YOSHIMASA (1); FUKUDA YASUHIRO (1); KIKUCHI AKIO (1); INUMARU SUSUMU (1)
(1) Sumitomo Light Metal Industries, Ltd., Technical Res. Labs.
Keikinzoku Gakkai Taikai Koen Gaiyo, 1989, VOL.77th, PAGE.103-104, FIG.6, TBL.2, REF.2
JOURNAL NUMBER: Y0775AAX
UNIVERSAL DECIMAL CLASSIFICATION: 621.767 678.027.74 669-492
LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Conference Proceeding
ARTICLE TYPE: Short Communication
MEDIA TYPE: Printed Publication

30/3,AB/12 (Item 12 from file: 94)
DIALOG(R)File 94:JICST-EPlus

00954672 JICST ACCESSION NUMBER: 90A0135068 FILE SEGMENT: JICST-E
Effects of thermal cycle on mechanical properties of alumina short fiber reinforced aluminum alloys.
NAKANISHI MASARU (1); NISHIDA YOSHINORI (1); MATSUBARA HIROMI (1); YAMADA

MAMORU (1); SAKAI YOSHIFUMI (2); IKEDA KEN'ICHI (2)
(1) Gov. Industrial Res. Inst., Nagoya; (2) Daido Inst. of Technology
Keikinzoku Gakkai Taikai Koen Gaiyo, 1989, VOL.77th, PAGE.117-118, FIG.4, REF.3
JOURNAL NUMBER: Y0775AAX
UNIVERSAL DECIMAL CLASSIFICATION: 669-419.8 669.017:539.4.01 621.763
LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Conference Proceeding
ARTICLE TYPE: Short Communication
MEDIA TYPE: Printed Publication

30/3,AB/13 (Item 13 from file: 94)
DIALOG(R)File 94:JICST-EPlus

00954670 JICST ACCESSION NUMBER: 90A0135066 FILE SEGMENT: JICST-E
Fabrication of aluminum borate whiskers reinforced aluminum alloy by high pressure casting process.
SUGANUMA YOSHIAKI (1); FUJITA TERUAKI (1); SUZUKI NOBUYUKI (2); NIIHARA KOICHI (3)
(1) National Defense Academy; (2) EvEMUvTEKUNOROJI; (3) Osaka Univ., Inst. of Scientific and Industrial Res.
Keikinzoku Gakkai Taikai Koen Gaiyo, 1989, VOL.77th, PAGE.113-114, FIG.4, TBL.1, REF.1
JOURNAL NUMBER: Y0775AAX
UNIVERSAL DECIMAL CLASSIFICATION: 669:621.74.04 669-419.8 621.763
LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Conference Proceeding
ARTICLE TYPE: Short Communication
MEDIA TYPE: Printed Publication

30/3,AB/14 (Item 14 from file: 94)
DIALOG(R)File 94:JICST-EPlus

00449513 JICST ACCESSION NUMBER: 87A0363098 FILE SEGMENT: JICST-E
Material related technology for printed wiring board. Present state and future perspective of the introduction of **composite material** to printed wiring board. Various **composite materials** for printed wiring board.
HASEGAWA KIN'ICHI (1)
(1) Sumitomobekuraito Kairozaiken
Gosei Jushi(Plastics), 1987, VOL.33,NO.6, PAGE.8-17, FIG.8, TBL.11, REF.3
JOURNAL NUMBER: F0005AAY ISSN NO: 0387-0936
UNIVERSAL DECIMAL CLASSIFICATION: 621.3.049.75 678.06+
LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Journal
ARTICLE TYPE: Commentary
MEDIA TYPE: Printed Publication

30/3,AB/15 (Item 15 from file: 94)
DIALOG(R)File 94:JICST-EPlus

00292645 JICST ACCESSION NUMBER: 86A0430092 FILE SEGMENT: JICST-E
Functional metallic **composite materials**.

Kogyo Zairyo(Engineering Materials), 1986, VOL.34,NO.9, PAGE.54-56, FIG.2
JOURNAL NUMBER: F0172AAZ ISSN NO: 0452-2834 CODEN: KZAIA
UNIVERSAL DECIMAL CLASSIFICATION: 669.018.9
LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Journal
ARTICLE TYPE: Commentary
MEDIA TYPE: Printed Publication

30/3,AB/16 (Item 16 from file: 94)
DIALOG(R)File 94:JICST-EPlus

00275228 JICST ACCESSION NUMBER: 86A0374547 FILE SEGMENT: JICST-E
Application of **copper**-carbon fiber composites to power semiconductor devices.
KUNIYA KEIICHI (1); ARAKAWA HIDEO (1); SAKAUE TADASHI (2); MINORIKAWA HITOSHI (3); AKEYAMA KENJI (4); SAKAMOTO TATSUJI (5)
(1) Hitachi Ltd., Hitachi Res. Lab.; (2) Hitachi Ltd., Hitachi Works; (3) Hitachi Ltd., Sawa Works; (4)Hitachikomorokojo; (5) Hitachi Ltd., Mechanical Engineering Res. Lab.
Nippon Kinzoku Gakkaishi(Journal of the Japan Institute of Metals), 1986, VOL.50,NO.6, PAGE.583-589, FIG.9, TBL.2, REF.17
JOURNAL NUMBER: G0023AAV ISSN NO: 0021-4876 CODEN: NIKGA
UNIVERSAL DECIMAL CLASSIFICATION: 621.315.5 669-419.8
LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Journal
ARTICLE TYPE: Original paper
MEDIA TYPE: Printed Publication
ABSTRACT: In power semiconductor devices, a supporting electrode made of materials such as molybdenum or tungsten is inserted between a silicon wafer and a **copper** block. The electrode functions as a means for alleviating thermal stress acting on the wafer as well as a means for conducting electric current. However, molybdenum and tungsten have some problems : (1) Their coefficients of **thermal expansion** are not equal to that of the silicon wafer, (2) the thermal and electrical conductivities are not so high as desirable, and (3) their coefficients of **thermal expansion** do not meet that of insulating substrates such as a sintered alumina plate, which is used in a power module. We have already reported the development of a new **copper** -carbon fiber composite which possesses the properties of **copper**, i.e., the excellent electrical and thermal conductivities, and the properties of carbon fiber, i.e., a small **thermal expansion** coefficient. The properties of these **copper**-carbon fiber composites can be adjusted within a certain range by changing the volume fraction, kind and/or arrangement of carbon fibers, whereby the **thermal expansion** coeff cient can be adjusted to be approximately equal to that of silicon. One of the practical consequences of this work is that the composite can be soldered directly to silicon wafers. This new composite was applied to several power semiconductor devices, for example, resin molded diode, button type diode, stud type diode, power module and IC ignitor module. Theproperties of these power semiconductor devices were compared favorably with those conventional devices using molybdenum or tungsten electrodes. In the thermal fatigue tests, no degradation in the electrical and mechanical characteristics of these devices were observed. It is concluded that the new composite electrode with carbon fibers satisfies all of the major requirements for the electrodes in power semiconductor devices.(author abst.)

30/3,AB/17 (Item 17 from file: 94)
DIALOG(R)File 94:JICST-EPlus

00224932 JICST ACCESSION NUMBER: 86A0192052 FILE SEGMENT: JICST-E
Thermal expansion of tungsten fiber reinforced **copper** composites.
IKEUCHI YASUKAZU (1); MORI SHINNOSUKE (1); KATO MICHITOMO (1)
(1) Niihama Technical College
Niihama Kogyo Koto Senmon Gakko Kiyo. Rikogakuhen(Memoirs of the Niihama Technical College. Science and Engineering), 1986, VOL.22,NO.1, PAGE.121-128, FIG.6
JOURNAL NUMBER: G0175AAB ISSN NO: 0286-2743 CODEN: NKKSA
UNIVERSAL DECIMAL CLASSIFICATION: 536.2/.4:669 669-419.8
LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Journal
ARTICLE TYPE: Original paper
MEDIA TYPE: Printed Publication
ABSTRACT: The influence of matrix yield stress on thermal dilatation of the composites in the absence of external stresses was investigated in relation to matrix grain refining and work hardening. Two series of specimens were prepared, which were as follows. As-fabricated composites produced by a liquid infiltration technique (designated as AF specimen). Hot-rolled composites obtained from as-fabricated composites (designated as HR specimen). The experimental results of the present study are summarized as follows: (1) As for coarse-grained AF specimens, the heating and cooling curves formed a hysteresis loop on the measurement up to 585K and a small region of inflection was observed on each curve. In the temperature range which reached the inflection region on heating and cooling tests, the fiber and the matrix deformed elastically. The matrix began to yield at the inflection. (2) As for HR specimens, the matrix grain refining was observed and the temperature range which reached the inflection region was wider than that of AF specimens. (3) The matrix yield stress was increased because of matrix work hardening by cryogenic temperature excursion of the composites. By increase of the matrix yield stress, dimensional instability of the composites undergone temperature change up to 585K was greatly improved with decreasing fiber volume fraction.(author abst.)

30/3,AB/18 (Item 18 from file: 94)
DIALOG(R)File 94:JICST-EPlus

00207116 JICST ACCESSION NUMBER: 86A0159782 FILE SEGMENT: JICST-E
Interfaces and their control in **metal** matrix composites.
SHIOTA ICHIRO (1)
(1) National Res. Inst. for Metals
Hyomen Kagaku(Journal of the Surface Science Society of Japan), 1985, VOL.6,NO.4, PAGE.363-369, FIG.5, TBL.3, REF.16
JOURNAL NUMBER: F0940BAL ISSN NO: 0388-5321
UNIVERSAL DECIMAL CLASSIFICATION: 544.72-16 669-419.8
LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Journal
ARTICLE TYPE: Review article
MEDIA TYPE: Printed Publication

ABSTRACT: Sufficient transference of stress and no harmful reaction at the interface between the reinforcement and the matrix are simultaneously required in an FRM. Alloying Si, Mg, **Cu** or Fe in Al is effective in restrain the harmful Al4C3 in a C-Al FRM. Adding 2-3% Li in Al is useful to improve the wettability and also to control the reaction between the Al2O3 fibre and the Al matrix. A B4C or SiC barrier can suppress the AlB2 in B-Al. However neither of the barriers is of any use for a Ti matrix. On the other hand, Al, Mo or V in Ti can lessen the reaction. A **metal** filament such as W or Mo can only be applied to a superalloy matrix. The filament, however, is easily deteriorated by Ni, Co or Al which is the main composition of the superalloy. The deterioration can be restrained by dispersing ZrO2 in the W filament or by coating a ZrO2 barrier on the filament. (author abst.)

30/3,AB/19 (Item 19 from file: 94)
DIALOG(R)File 94:JICST-EPlus

00196196 JICST ACCESSION NUMBER: 86A0123581 FILE SEGMENT: JICST-E
Thermal expansion behavior of randomly oriented short carbon fiber reinforced **copper** composites.
KUNIYA KEIICHI (1); ARAKAWA HIDEO (1); NAMEKAWA TAKASHI (1)
(1) Hitachi Ltd., Hitachi Res. Lab.
Nippon Kinzoku Gakkaishi(Journal of the Japan Institute of Metals), 1985, VOL.49,NO.12, PAGE.1137-1141, FIG.9, REF.14
JOURNAL NUMBER: G0023AAV ISSN NO: 0021-4876 CODEN: NIKGA
UNIVERSAL DECIMAL CLASSIFICATION: 669-419.8 669.017:53+
LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Journal
ARTICLE TYPE: Original paper
MEDIA TYPE: Printed Publication
ABSTRACT: We have already reported the development of a new **copper** -carbon fiber composite which possesses the properties of **copper**, i.e., the excellent electrical and thermal conductivities and the property of carbon fiber, i.e., a small **thermal expansion** coefficient. The properties of the composite were expected to vary depending on the orientation of fibers. When applying the composite to some electronic devices, however, the properties of the composite have to be isotropic. For this purpose, several experiments were carried out on the composites with random orientation of short carbon fibers. Results obtained in this study were as follows : (1) The composite with random orientation of short carbon fibers swelled due to the elastic deformation of random-oriented carbon fiber's skelton at temperatures above 573 K. It was deduced that in a three-dimensionally isotropic composite such as above-mentioned, the **copper** matrix softened above 573 K was fractured by the repulsive force of carbon fibers which had been elastically deformed and were released at heating, resulting in the swelling of the composite. This swelling occurred, when the fiber content was over 20 volume percent or the fiber length exceeded 0.5 mm. (2) It was found that the addition of carbide forming elements such as titanium was effective to prevent the above swelling.(author abst.)

30/3,AB/20 (Item 20 from file: 94)
DIALOG(R)File 94:JICST-EPlus

00170269 JICST ACCESSION NUMBER: 86A0020603 FILE SEGMENT: JICST-E
Study on production method of aluminium-alumina **composite material**. 1.
MATSUI AKIRA (1); KITA IWAO (1); NAKAGAWA AKIRA (1); TOHO KIHACHIRO (1); NIKUCHI TOMOAKI (1)
(1) Industrial Res. Inst. of Toyama Prefect.
Toyamaken Kogyo Shikenjo Kenkyu Hokoku Shorokushu, 1985, VOL.1984, PAGE.31-32, FIG.4, TBL.3
JOURNAL NUMBER: Z0891ABY
UNIVERSAL DECIMAL CLASSIFICATION: 669-419.8 621.763
LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Journal
ARTICLE TYPE: Short Communication
MEDIA TYPE: Printed Publication

30/3,AB/21 (Item 21 from file: 94)
DIALOG(R)File 94:JICST-EPlus

00160724 JICST ACCESSION NUMBER: 85A0520158 FILE SEGMENT: JICST-E
Thermal conductivity, electrical conductivity and specific heat of **copper**-carbon fiber composite.
KUNIYA KEIICHI (1); ARAKAWA HIDEO (1); KANAI TSUNEYUKI (1); CHIBA AKIO (1)
(1) Hitachi Ltd., Hitachi Res. Lab.
Nippon Kinzoku Gakkaishi(Journal of the Japan Institute of Metals), 1985, VOL.49,NO.10, PAGE.906-912, FIG.11, TBL.2, REF.10
JOURNAL NUMBER: G0023AAV ISSN NO: 0021-4876 CODEN: NIKGA
UNIVERSAL DECIMAL CLASSIFICATION: 669.017:53+ 669.017:537.03 669-419.8
LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Journal
ARTICLE TYPE: Original paper
MEDIA TYPE: Printed Publication
ABSTRACT: We have developed a new material of **copper**-carbon fiber composite which possesses the properties of **copper**, i.e., the excellent electrical and thermal conductivities, and the property of carbon fiber, i.e., a small **thermal expansion** coefficient. These properties of the composite are adjustable within a certain range by changing the volume and/or arrangement of carbon fibers. The effects of volume and arrangement of fiber on the thermal conductivity, electrical conductivity and specific heat of the composite were studied. Results obtained are as follows: (1) The thermal and electrical conductivities of the composite became smaller as the volume of carbon fiber increased, and were influenced by the fiber arrangement. (2) The above results were predictable from a careful application of the "rule of mixtures" for composites. (3) The specific heat of the composite was dependent not on the fiber arrangement but on the fiber volume. (4) In the thermal fatigue tests, no degradation in the electrical conductivity of this composite was observed. (author abst.)

30/3,AB/22 (Item 22 from file: 94)
DIALOG(R)File 94:JICST-EPlus

00119747 JICST ACCESSION NUMBER: 85A0374806 FILE SEGMENT: JICST-E
Thermal expansion coefficients of unidirectional and angle

plied silicon-carbide fiber-reinforced aluminum alloys.
YAMADA SEN'ICHI (1); TOWATA SHIN'ICHI (1)
(1) Toyota Central Res. and Development Labs. Inc.
Nippon Kinzoku Gakkaishi(Journal of the Japan Institute of Metals), 1985,
VOL.49,NO.5, PAGE.376-381, FIG.9, REF.11
JOURNAL NUMBER: G0023AAV ISSN NO: 0021-4876 CODEN: NIKGA
UNIVERSAL DECIMAL CLASSIFICATION: 669.017:53+ 669-419.8 669:621.74.04
LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Journal
ARTICLE TYPE: Original paper
MEDIA TYPE: Printed Publication
ABSTRACT: The linear **thermal expansion** of unidirectional and angle plied silicon-carbide fiber-reinforced aluminum alloys was measured as functions of fiber and plying angles. These composites were prepared by a squeeze casting method, and pure Al and an Al-4.5% **Cu** alloy were used as matrix metals. The results are as follows : (1) Transition points TA and TB were observed in the **thermal expansion** curves for all the specimens measured. TA corresponds to the transition from elastic to plastic deformation of the matrix, and TB corresponds to the transition from plastic deformation to plastic flow of the matrix. (2) The linear **thermal expansion** coefficients of the composites measured in the longitudinal and transverse directions agreed very well with the values calculated from Schapery's theoretical equations. In the calculation, the tensile moduli and Poisson's ratios of the matrix alloys were used as the elastic values below TA temperature, while Em=0 GPa and .NU.m=0.5 were used as plastic values for temperatures above TB. (3) From the above values,the linear **thermal expansion** coefficients were calculated for arbitrary directions by modifying the Uemura's theoretical equation. In the ranges of (T0-TA) and (TB-T573), a good correlation was obtained between the calculated and observed coefficients.

30/3,AB/23 (Item 23 from file: 94)
DIALOG(R)File 94:JICST-EPlus

00068273 JICST ACCESSION NUMBER: 85A0198050 FILE SEGMENT: JICST-E
Thermal expansion, Young's modulus and Poisson's ratio of **copper**-carbon fiber composite.
KUNIYA KEIICHI (1); ARAKAWA HIDEO (1); KANAI TSUNEYUKI (1)
(1) Hitachi Ltd., Hitachi Res. Lab.
Nippon Kinzoku Gakkaishi(Journal of the Japan Institute of Metals), 1985,
VOL.49,NO.4, PAGE.291-297, FIG.12, TBL.4, REF.11
JOURNAL NUMBER: G0023AAV ISSN NO: 0021-4876 CODEN: NIKGA
UNIVERSAL DECIMAL CLASSIFICATION: 669-419.8 669.017:539.4.01
LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Journal
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30/3,AB/24 (Item 24 from file: 94)
DIALOG(R)File 94:JICST-EPlus

00017202 JICST ACCESSION NUMBER: 85A0033385 FILE SEGMENT: JICST-E
Low expansion **copper**. Carbon fiber **composite material**.

KUNIYA KEIICHI (1); ARAKAWA HIDEO (1)
(1) Hitachi Ltd., Hitachi Res. Lab.
Nippon Fukugo Zairyo Gakkaishi(Journal of the Japan Society for Composite Materials), 1984, VOL.10,NO.4, PAGE.152-156, FIG.8, TBL.1, REF.16
JOURNAL NUMBER: S0977AAT ISSN NO: 0385-2563
UNIVERSAL DECIMAL CLASSIFICATION: 669-419.8 621.315.5
LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Journal
ARTICLE TYPE: Commentary
MEDIA TYPE: Printed Publication

36/3,AB/1 (Item 1 from file: 144)
DIALOG(R)File 144:Pascal

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Microwave induced reduction/oxidation of powders to form ceramic-metal composites
Proceedings of the 21st Annual conference on composites, advanced ceramics, materials, and structures - B : Cocoa Beach FL, January 12-16, 1996
DI FIORE R R; CLARK D E
SINGH JP, ed
Dept. of Material Science and Engineering, University of Florida, Gainesville, FL 32611 , United States
Annual conference on composites, advanced ceramics, materials, and structures, 21 (Cocoa Beach FL USA) 1997-01-12
Journal: Ceramic engineering and science proceedings, 1997, 18 (4) 557-562
Language: English
The objective of this project was to create unique composites using microwave induced reduction and oxidation reactions and analyze the resulting properties. Ceramic-metal composites (CMC) were formed by reducing ceramic oxides and oxidizing metal powders. Ceramic and metal powders were pressed into discs and processed in a highly reducing atmosphere using microwave hybrid heating. Two systems were studied : **CuO**/Al and MgTiO SUB 3 . The reduction/oxidation (redox) of the **CuO**/Al resulted in a **Cu**/Al SUB 2 O SUB 3 composite. Reduction of the MgTiO SUB 3 created a conductive MgTiO SUB 3 SUB - SUB x composite. Multilayered composites were created by alternating **layers** of the **conductive** MgTiO SUB 3 SUB - SUB x and the dielectric MgTiO SUB 3 .

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